APPENDIX E - Pilot's Guide

LYNX®
MULTILINK SURVEILLANCE SYSTEM

Pilot's Guide for Models

NGT-9000 **NGT-9000R**
NGT-9000+ **NGT-9000R+**
NGT-9000D **NGT-9000RD**

L3 Aviation Products

Rev.4/07-13-2016

Document Precedence

This Pilot's Guide provides general information about the operation of the NGT-9000. Refer to your FAA-approved Airplane Flight Manual (AFM) and its flight manual supplements for information specific to your aircraft. If there is conflicting information between the AFM and this guide, the AFM takes precedence over this guide.

Disclaimer

This Pilot's Guide is subject to change without notice. The illustrations in this guide are typical for the Lynx NGT-9000.

Screen information may look different on displays interfaced with the Lynx NGT-9000. Refer to the pilot's guide for that display for a description of how information is depicted.

The installation of ADS-B In avionics provides the pilot with supplemental information and does not replace a pilot's see-and-avoid responsibility. This equipment is not approved as a collision avoidance tool. Any deviation from an air traffic control clearance based on cockpit information must be approved by the controlling ATC facility prior to commencing the maneuver. Uncoordinated deviations may place an aircraft in close proximity to other aircraft under ATC control not seen on the airborne equipment and may possibly result in the issuance of a pilot deviation.

ADS-B is currently being deployed throughout the National Airspace System (NAS). The availability of U.S. ground based transceivers (GBT) is limited in selected areas. For information regarding the FAA's system of ADS-B, TIS-B, ADS-R, and FIS-B refer to the FAA's Aeronautical Information Manual sections 4-5-7 to 4-5-10.

Revision Highlights

- Add release 1.2 changes which includes new configuration options to remove TIS-B no coverage indicator, remove FIS-B function.

Pilot's Guide

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Product Part No. 9029000-20000 (panel mount)
9029000-40000 (remote mount)
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List Of Abbreviations and Acronyms

°	Degree
AC	Advisory Circular
ABV	Above
ADS-B	Automatic Dependant Surveillance – Broadcast
ADS-R	Automatic Dependant Surveillance – Rebroadcast
AFM	Airplane Flight Manual
AGL	Above Ground Level
AIRMET	Airmen's Meteorological Information
ALT	Altitude
ATC	Air Traffic Control
ATCRBS	Air Traffic Control Radar Beacon System
BLW	Below
BRT	Brightness
CDTI	Cockpit Display of Traffic Information
CONUS	Contiguous United States
CPA	Closest Point of Approach
DCM	Detachable Configuration Module
DTIF	Display Traffic Information File
DO-	RTCA Document
EAR	Export Administration Regulations
EGPWS	Enhanced Ground Proximity Warning System
FAA	Federal Aviation Administration
FDE	Fault Detection and Exclusion
FIS-B	Flight Information Service - Broadcast
fl	Foot-Lambert
ft	Feet
ft/min	Feet Per Minute
GA	General Aviation
GBT	Ground Based Transceiver
GALT	GPS Altitude
GND	Ground
GPS	Global Positioning System
GS	Ground Speed
GPWS	Ground Proximity Warning System
HAE	Height Above Ellipsoid
HPL_{SBAS}	Horizontal Protection Level Using SBAS error estimates
HPL_{FD}	Horizontal Protection Level using a weighted FDE algorithm
hPa	Hectopascals
Hz	Hertz
ICAO	International Civil Aviation Organization
ID	Identification
IDENT	Identification
InHg	Inches of Mercury
kt/kts	Knot (s)
lbs	pounds
max	Maximum
METAR	Aviation Routine Weather Report
MHz	Mega Hertz

List Of Abbreviations And Acronyms (cont.)

MSG	Message
MSS	Multilink Surveillance System
NACp	Navigation Accuracy Category for Position
NAR	Non Altitude Reporting
NAS	National Airspace System
NEXRAD	Regional and Next-Generation Radar
NIC	Navigation Integrity Category
NOTAM	Notices to Airmen
NM or nmi	Nautical Miles
NRM	Normal
OT	Other Traffic
PA	Proximity Advisory
PALT	Pressure Altitude
PED	Personal Electronic Device (e.g., tablet)
PIREP	Pilot Report
P/N	Part Number
R	Reply
RAIM	Receiver Autonomous Integrity Monitoring
REF	Reference
RTCA	Radio Technical Commission for Aeronautics, Inc.
SBAS	Satellite-Based Augmentation System
SIGMET	Significant Meteorological Information
SIL	Source Integrity Level
SPECI	Aviation Special Selected Weather
SPI	Special Identification
STBY	Standby
SUA	Special Use Airspace
SSR	Secondary Surveillance Radar
TA	Traffic Advisory
TAF	Terminal Aerodrome Forecast
TAS	Traffic Awareness System
TFC	Traffic
TIF	Traffic Information File
TRK	Track
TFR	Temporary Flight Restrictions
TIS-B	Traffic Information Service - Broadcast
TSO	Technical Standard Order
UAT	Universal Access Transceiver
UNR	Unrestricted
VFR	Visual Flight Rules
VMC	Visual meteorological conditions
WAAS	Wide Area Augmentation System
Wx	Weather
XPDR	Transponder

CHAPTER 1
DESCRIPTION

INTRODUCTION

The Lynx NGT-9000 family of products are 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 Lynx NGT-9000 also receive ADS-B data via 1090ES and UAT (978 MHz Universal Access Transceiver).

The panel mounted version of the Lynx NGT-9000 has a multifunction touch screen display that allows the user to view transponder, traffic, and weather information. The touch screen provides the means to select screen views and interface with transponder, traffic, and weather displays. See Figure 1-1.

The remote version of the Lynx NGT-9000 provides the same functionality as the panel mount, but is controlled using a compatible alternate display or controller. See Figure 1-2.

In addition to ADS-B surveillance, some models of the Lynx NGT-9000 include an Active Traffic Awareness System (TAS) as well as support for antenna diversity. Table 1-1 provides model and part number information. The TAS and Diversity options are software activated features.

Table 1-1: Model Options

MODEL	PART NUMBER	TAS	DIVERSITY	REMOTE
NGT-9000	9029000-20000	No	No	No
NGT-9000+	9029000-20000	Yes	No	No
NGT-9000D	9029000-20000	No	Yes	No
NGT-9000R	9029000-40000	No	No	Yes
NGT-9000R+	9029000-40000	Yes	No	Yes
NGT-9000RD	9029000-40000	No	Yes	Yes

Figure 1-1: Example of Panel Mount Lynx NGT-9000

SPECIFICATIONS

Part Number:	9029000-20000 (panel mount)
Weight:	2.96 Lbs.
Power Requirements:	+14.0 VDC nominal or +28.0 VDC nominal. 19.0 watts nominal, 24.0 watts maximum
Display Luminance:	Range 0.05 fl to 150 fl
Start Up Time	On Ground 20 seconds or less In air 5 seconds or less.
Interfaces:	ARINC 429, RS-422, RS-232, Discrete Input/Outputs, RF Suppression Bus, and DCM serial interface .
Functionality:	• Mode S Transponder • Global Positioning System (GPS) • ADS-B/TIS-B Receive: (1090ES/UAT) • ADS-B Transmit: (1090ES) • FIS-B (UAT) • Mode S Transponder Diversity (optional) • Traffic Awareness System (TAS) (optional)
Service Life:	Unlimited.
Scheduled Maintenance:	No scheduled maintenance is required. As a transponder device, FAA document 91.413 requires testing and inspection of a transponder every 24 months.
Repairs:	Repairs performed at the FAA certificated Repair Station co-located at the OEM (equipment) facility.
Compliance:	The Lynx NGT-9000 has been shown to meet the requirements in TSO-C166b and meets the requirements of 14 CFR 91.225a installed in accordance with the installation instructions.

SPECIFICATIONS

Part Number:	9029000-40000 (remote mount)
Weight:	2.75 Lbs.
Power Requirements:	+14.0 VDC nominal or +28.0 VDC nominal. 17.0 watts nominal, 24.0 watts maximum
Start Up Time	On Ground 20 seconds or less In air 5 seconds or less.
Interfaces:	ARINC 429, RS-422, RS-232, Discrete Input/Outputs, RF Suppression Bus, and DCM serial interface .
Functionality:	• Mode S Transponder • Global Positioning System (GPS) • ADS-B/TIS-B Receive: (1090ES/UAT) • ADS-B Transmit: (1090ES) • TIS-B (1090ES) • FIS-B (UAT) • Mode S Transponder Diversity (optional) • Traffic Awareness System (TAS) (optional)
Service Life:	Unlimited.
Scheduled Maintenance:	No scheduled maintenance is required. As a transponder device, FAA document 91.413 requires testing and inspection of a transponder every 24 months.
Repairs:	Repairs performed at the FAA certificated Repair Station co-located at the OEM (equipment) facility.
Compliance:	The Lynx NGT-9000R has been shown to meet the requirements in TSO-C166b and meets the requirements of 14 CFR 91.225b installed in accordance with the installation instructions.

PILOT ADVISORY

The display of ADS-B data only supplements and does not replace any operational procedure. All pilots/operators are reminded that the airborne equipment that displays traffic is only for pilot situational awareness. This equipment is not approved as a collision avoidance tool and does NOT relieve the pilot of responsibility to “see-and-avoid” other aircraft. Any deviation from an air traffic control clearance based on cockpit information must be approved by the controlling ATC facility prior to commencing the maneuver. Uncoordinated deviations may place an aircraft in close proximity to other aircraft under ATC control not seen on the airborne equipment and may possibly result in the issuance of a pilot deviation.

- Occasionally the traffic display may show a “shadow” or duplicate of your own aircraft on the traffic display. Generally this is caused by a TIS-B track of you aircraft reported from a ground station. In most cases, the own aircraft TIS-B tracks are detected and filtered out by the NGT software. In some cases, own aircraft maneuvers can cause enough separation of the TIS-B track from own aircraft that it is treated as a new intruder and displayed. This is not an error or malfunction in the system. As ground stations improve, the occurrence of these shadows should be minimized or eliminated.
- Ground stations only produce TIS-B intruders for Mode C/S equipped aircraft that have no ADS-B output. Mode A or non-transponder equipped aircraft are not reported as TIS-B intruders. It is the pilots responsibility to “see and avoid”.
- Information shown on the display is provided to the pilot as an aid to visually acquiring traffic. When under ATC control 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.
- The transponder signal must be transmitting during all flight operations. It may be placed in standby only if the system is inoperable or if advised by ATC to disable ADS-B.
- Loss of input data may not cause the NGT-9000 to fail but could degrade operation. Failure and degraded conditions will be annunciated by the NGT-9000 to alert the pilot to the operational status. In many cases, fault conditions will recover if erroneous data inputs are restored.
- Aircraft will be displayed when the information received meets ADS-B, ADS-R, and TIS-B data integrity requirements.

FUNCTIONAL DESCRIPTION

The panel mount versions of the Lynx NGT-9000 can display and control the following information:

- Flight ID or aircraft Tail Number
- Transponder (MODE S) and Traffic Mode of Operation
- Derived Altitude Data
- ADS-B On/Off status
- VFR Select and Squawk Code Input
- IDENT
- Traffic (graphic and textual)
- Weather (graphic and textual)
- TAS Mode (model specific)

The remote mount versions of the Lynx NGT-9000 provides the same functionality as the panel mount, but is controlled using a CP-2500 Control Panel. Display information is shown on a optional compatible display or PED. See Figure 1-2.

Figure 1-2: Example of Remote Mount Lynx NGT-9000

The Lynx NGT-9000 replies to Mode A, Mode C and Mode S interrogations on 1030 MHz and transmitting responses at 1090 MHz.

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.

Models with the TAS option provide TAS traffic advisories and a voice audio output that announces Traffic Advisories and relative altitude.

The unit has multiple transmit/receive ARINC 429, RS-422 and RS-232 data ports used to transmit data to traffic, weather, and PED displays.

The unit provides the transponder code, reply symbol and mode of operation to the display.

The Lynx NGT-9000 provides own aircraft data via ADS-B Out capabilities. The ADS-B In capabilities include Basic Airborne Situational Awareness (AIRB) and 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 data link have the following capabilities

- 1090 In - Receives ADS-B, ADS-R and TIS-B
- 1090ES Out - Transmit ADS-B
- UAT In - Receives ADS-B, FIS-B, ADS-R, TIS-B

A description of these functions are provided below. A composite of UAT / 1090ES traffic (UAT, 1090ES, ADS-R, and TIS-B) is provided in Figure 1-3.

Model Options

The Traffic Awareness System (TAS) option provides the system the capability to interrogate nearby aircraft transponders and issue Traffic Advisory (TA) alert to the flight crew. This option requires the installation of a directional antenna.

The Diversity option offers enhanced traffic awareness via 1090MHz using the ADS-B service. This option requires the installation of an additional top mounted UAT (L-Band) antenna.

Automatic Dependent Surveillance - Broadcast (ADS-B)

ADS-B improves situational awareness and flight safety by providing real time traffic information. The ADS-B In function is used to receive ground station supported TIS-B and ADS-R traffic, and direct communication with nearby like equipped aircraft (with Mode S or UAT). The ADS-B Out (1090ES) function is used to periodically broadcast (without interrogation) information about the aircraft that includes aircraft identification, position, altitude, velocity and other aircraft status information.

- ADS-B is NOT intended to be used as a collision avoidance system and does NOT relieve the pilot of responsibility to “see-and-avoid” other aircraft.
- No avoidance maneuvers are provided for, nor authorized, as a direct result of a ADS-B other aircraft being displayed in the cockpit. Avoidance maneuvers must be based on visually acquiring the target

- The traffic display shows the relative position of ADS-B or standard traffic using text, shapes, and colors. ADS-B also provides similar information on ADS-B equipped ground vehicles.
- The effective surveillance range is 60 nmi (ADS-B In) The passive-mode surveillance range is 160 nmi and maintains report messages for a minimum of 200 1090ES ADS-B participants and 300 UAT ADS-B participants simultaneously. To reduce display clutter a set number of other aircraft of the highest priority other aircraft are displayed at a time.

Automatic Dependent Surveillance – Re-broadcast (ADS-R)

ADS-R is a ground based broadcast service that repeats ADS-B messages from one link (1090 MHz or 978 MHz) to the other link for aircraft with ADS-B In.

- ADS-R is NOT intended to be used as a collision avoidance system and does NOT relieve the pilot of responsibility to “see-and-avoid” other aircraft.
- No avoidance maneuvers are provided for, nor authorized, as a direct result of a ADS-R other aircraft being displayed in the cockpit. Avoidance maneuvers must be based on visually acquiring the target.
- The actual availability of services depends upon both the availability of a ground station to support ADS-R source data and aircraft being within range of the ground station.
- ADS-R transmissions are updated at least every 2 seconds on the surface, 5 seconds in the terminal area, and 10 seconds in the en-route airspace.
- Other aircraft are provided by the ground station if within a 15 nm horizontal range and +/-5,000 ft of altitude of the receiving aircraft. ADS-B equipped ground aircraft and vehicles are not displayed to airborne aircraft.
- An aircraft on the ground receiving ADS-R is provided both ground aircraft and vehicles as well as airborne other aircraft within 5nm and 2,000 ft above ground level of the airport reference point.
- Receiving aircraft must be in both ATC radar coverage and ground based transceiver (GBT) coverage in a given area to receive ADS-R service in that area. ADS-R range is larger than the TIS-B range of 24,000 ft above station.

Traffic Information Service - Broadcast (TIS-B)

TIS-B is the broadcast from Ground Radio Stations of ATC-derived traffic information to ADS-B equipped aircraft.

- The actual availability of services depends upon the availability of ground-based radar to support TIS-B source data.
- Receiving aircraft must be in both ATC radar coverage and ground based transceiver (GBT) coverage in a given area to receive TIS-B service in that area. When ownship is above 24,000 ft, the ground station will no longer provide TIS-B service. (Targets will be provided up to 27,500 ft)
- Other aircraft are provided by the ground station if within a 15nm horizontal range and +/-3,500 ft of altitude of the receiving aircraft. ADS-B equipped ground aircraft and vehicles are not displayed to airborne aircraft.
- Aircraft not equipped with a transponder, or equipped with a Mode A only transponder are not part of the TIS-B data and will not be seen on the traffic display.
- The ground station will not provide display information for Mode C and Mode S transponder equipped aircraft that do not provide altitude information.
- An aircraft on the ground receiving TIS-B is provided both ground aircraft and vehicles as well as airborne other aircraft within 5nm and 2,000 ft above ground level of the airport reference point.
- The TIS-B service is intended to improve the pilot's ability to visually see traffic in the air and on the airport surface so that pilots can more effectively apply traditional "see-and-avoid" techniques.
- TIS-B is NOT intended to be used as a collision avoidance system and does NOT relieve the pilot of responsibility to "see-and-avoid" other aircraft.
- No avoidance maneuvers are provided for, nor authorized, as a direct result of a TIS-B other aircraft being displayed in the cockpit. Avoidance maneuvers must be based on visually acquiring the target.

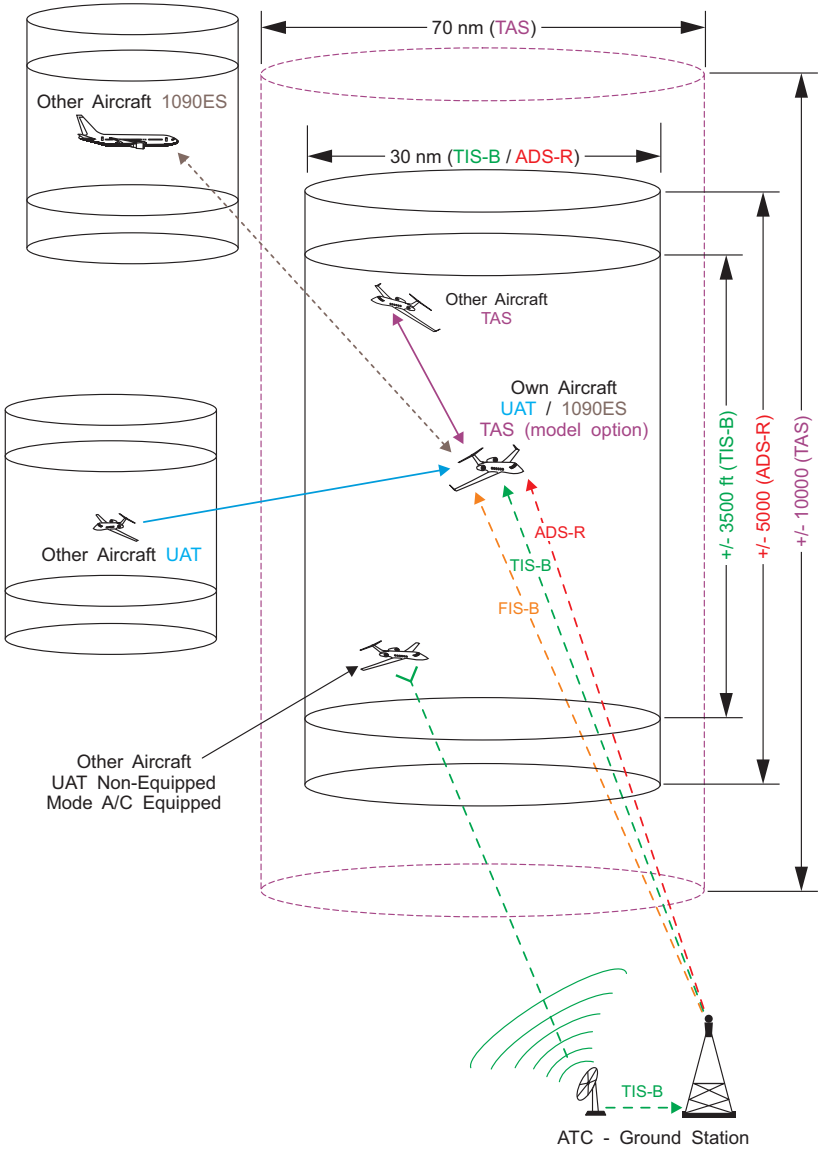

Figure 1-3: Example of Own Aircraft UAT, 1090ES, & TAS Traffic

Traffic Awareness System (TAS)

The TAS option is available with model NGT-9000+ and NGT-9000R+. TAS 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; with an effective active-mode surveillance range of 35 nmi. 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 NGT-9000+ or NGT-9000R+ 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 NGT-9000+ 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, Proximate Traffic = solid diamond) and colors.
- The effective active-mode surveillance range is 35 nmi and track 35 ATCRBS intruders simultaneously with the other aircraft bearing relative to the nose of own aircraft.
- The tracking of other aircraft is in a cylindrical volume centered on own aircraft with a maximum radius of 35 nmi and extending 10,000 ft above and 10,000 ft below own aircraft.
- The system uses an audio output that announces Traffic Advisory and relative bearing, relative altitude and range.

Refer to Chapter 4 Principles of TAS Operation for more information.

Flight Information Service - Broadcast (FIS-B)

FIS−B is a ground broadcast service provided through the ADS−B Services network over the 978 MHz UAT data link. The FAA FIS−B system provides pilots and flight crews of properly equipped aircraft with a cockpit display of certain aviation weather and aeronautical information. FIS−B service availability is installed across the NAS and is currently available within certain regions.

The weather products provided by FIS−B are for information only. Therefore, these products do not meet the safety and regulatory requirements of official weather products. The weather products displayed on FIS−B should not be used as primary weather products, i.e., aviation weather to meet operational and safety requirements. Official weather products (primary products) can be obtained from a variety of sources including ATC, FSSs, and, if applicable, AOCC VHF/HF voice, which can transmit aviation weather, NOTAMS, and other operational aeronautical information to aircraft in flight.

FIS−B augments the traditional ATC/FSS/ AOCC services by providing additional information and, for some products, offers the advantage of being displayed graphically. By using FIS−B for orientation and information, the usefulness of information received from official sources may be enhanced, but the user should be alert and understand any limitations associated with individual products. FIS−B provides the initial basic products listed in Table 1-2 at no charge to the user. FIS−B reception is line−of−sight within the service volume of the ground infrastructure.

Table 1-2: Description of FIS-B Available Information

PRODUCT	DESCRIPTION
AIRMET	Text/graphical report - Airmen's Meteorological Information is a weather advisory issued by a meteorological watch office a potentially hazardous condition exists for low-level aircraft and/or aircraft with limited capability. Compared to SIGMETs, AIRMETs cover less severe weather: moderate turbulence and icing, surface winds of 30 knots, or widespread restricted visibility.
METAR	Text reports − Surface meteorological data. Includes airport identifier, time of observation, wind, visibility, runway visual range, present weather phenomena, sky conditions, temperature, dew point, and altimeter setting. Remarks may be appended to the end.
NEXRAD, Regional	Graphical report - Next-Generation Radar is a nationwide network of high resolution Doppler weather radars, which detect precipitation and atmospheric movement or wind. It returns data which when processed can be displayed in a mosaic map which shows patterns of precipitation and its movement. The "Regional NEXRAD" FIS-B product is a composite of available NEXRAD radar imagery in a local area, showing a more detailed image than the "CONUS NEXRAD" product.
NEXRAD, CONUS	Graphical report - The "CONUS NEXRAD" FIS-B product is a summary composite of available NEXRAD radar imagery across the 48 states.
NOTAM	Text/graphical report - Notice To Airmen is created and transmitted by government agencies under guidelines specified by Annex 15: Aeronautical Information Services of the Convention on International Civil Aviation. A NOTAM is filed with an aviation authority to alert aircraft pilots of any hazards En Route or at a specific location. The FIS-B NOTAM product consists of NOTAM-Ds and NOTAM-FDCs (including TFRs).
SIGMET	Text/graphical report − Potentially hazardous en route phenomena such as thunderstorms and hail, turbulence, icing, sand and dust storms, tropical cyclones, and volcanic ash in an area affecting 3,000 square miles or an area deemed to have a significant effect on safety of aircraft operations.

Table 1-2: Description of FIS-B Available Information (continued)

PRODUCT	DESCRIPTION
SIGMET, Convective	Text/graphical report - hazardous thunderstorms and related phenomena across Continental US. Convective SIGMETs issued for thunderstorms and related phenomena do not include with thunderstorms such as turbulence, icing, low level wind shear and IFR conditions
TAF	Text report - Terminal Aerodrome Forecast is a format for reporting aviation weather forecast information. Generally a TAF is a 9- or 12-hour forecast, though some TAFs can cover an 18- or 24-hour period. TAFs complement and use similar encoding to METAR reports. They are produced by a human forecaster based on the ground. For this reason there are fewer TAF locations than there are METARs. TAFs can be more accurate than Numerical Weather Forecasts, since they take into account local, smallscale, geographic effects.
Winds and Temperatures Aloft	Graphical report - Winds and Temperature Aloft Forecast is forecast for specific atmospheric conditions in terms of wind and temperature in a specific altitude measured mostly in feet (ft) above mean sea level (MSL). The forecast is specifically used for aviation purposes.

EQUIPMENT DESCRIPTION

The Lynx NGT-9000 MSS family consists of the following standard and optional equipment. Refer to the Aircraft Flight Manual Supplement to determine what optional equipment is installed. Chapter 3 provides a list of optional cockpit switches and lamps.

Required Equipment

- GPS Antenna
- L-Band (978MHz/1030/MHz/1090MHz) Antenna
- Detachable Configuration Module (DCM)

Optional Equipment

- Directional Antenna (required for TAS operation)
- Additional L-Band Antenna (required for diversity operation)
- Traffic Display
- Weather Display
- WiFi Serial Adapter and Personal Electronic Device (PED)
- CP-2500 Control Panel (Required for the remote mount version)

GPS Antenna and Internal GPS Receiver

The GPS utilizes signals from Global Positioning System (GPS) satellite constellation and Satellite-Based Augmentation Systems (SBAS). The Lynx NGT-9000 have an internal GPS function that provides position, velocity, time and integrity (NIC, NAC etc) information to the ADS-B functions. The antenna is located on the top of the aircraft.

L-Band Antenna

The L-Band antenna is used by the Lynx NGT-9000 to receive 1030MHz, receive and transmit 1090MHz and receive 978MHz. It is located on the bottom of the aircraft.

A second L-Band antenna is installed on the top of the aircraft for models with Diversity.

Detachable Configuration Module (DCM)

The DCM is a solid-state device that retains software and hardware configuration information. It is permanently attached to the aircraft via the wiring harness and communicates with Lynx NGT-9000 via serial bus. Configuration options are set up during installation. The configuration data that is saved on the DCM are as follows: DCM configuration version, configuration, input / output interface options, aircraft specific options, and installation calibration parameters.

Directional Antenna

A directional antenna is used to receive 1090MHz and transmit 1030MHz for models with TAS.

Alternate Displays

Screen information may look different on displays interfaced with the Lynx NGT-9000. Refer to that display's manual for a description of how information is depicted.

The operation and display features provided in this Pilot's Guide are specific to the information depicted on the Lynx NGT-9000.

Personal Electronic Device (PED)

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

WiFi Serial Adapter

The Lynx NGT-9000 can be connect to a PED via WiFi using a compatible WiFi Serial Adapter.

CP-2500 Control Panel

The CP-2500 is a control panel offered by L-3 Avionics Systems. It is the only compatible control panel for the remote mount Lynx NGT-9000. The operational information provided in this guide is limited. Refer to the CP-2500 Pilot's Guide (0040-17250-01) for detailed information.

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CHAPTER 2
OPERATION

INTRODUCTION

This chapter describes preflight procedures for the panel and remote mount Lynx NGT-9000. Operational information in this chapter is specific to the panel mount Lynx NGT-9000.

Refer to Chapter 3 (Controls and Indicators) for operation information for installations with a CP-2500 Control Panel or compatible display.

POWER (REMOTE MOUNT)

1. There is no power on/off switch for the remote mount version of the Lynx NGT-9000. Depending on the aircraft, use either the battery switch or avionics master switch to apply power.
2. Normal operation begins within 20 seconds of applying power. During start up the unit checks for valid configuration data and initializes self tests.
3. The GPS begins initializing.
   a. If installed (and On Ground) the CP-2500 displays no message for first 2 minutes, than displays “GPS-INIT” indefinitely until a GPS position is acquired.
      - If an ADS-B System Fail is displayed after approximately 2 minutes, then the GPS position was not acquired.
      - Cycle power to the Lynx NGT-9000 to restart GPS initialization. If the problem continues, refer to the troubleshooting section for possible corrective actions.

   b. If installed the ADS-B Out Fail lamp is Off for 2 minutes and then flashes (1 second On/Off) indefinitely until a GPS position is acquired. Normally, GPS acquisition occurs within the first minute and therefore no lamp flashing occurs.

NORMAL OPERATION (REMOTE MOUNT)

Operational control of the remote mount version of the Lynx NGT-9000 is accomplished with a CP-2500 Control Panel. An ADS-B Out Fail lamp (if installed) provides ADS-B output status of the Lynx NGT-9000.

Operation and control information for the CP-2500 Control Panel is found in Chapter 3 (Controls and Indicators) or in the CP-2500 Pilot's Guide (0040-17250-01).

POWER (PANEL MOUNT)

There is no power on/off switch on the panel mount version of the Lynx NGT-9000. Depending on the aircraft, use either the battery switches or avionics master switch to apply power. After power is applied the unit begins initialization and self-tests begin. When on ground the unit cycles through the following screen sequence:

- Splash
- System Status / Version
- Flight ID (optional)
- Normal Operation

When in air and power is cycled the unit transitions to normal operation within 5 seconds, bypassing the splash, version and flight ID screens.

Splash Screen

The splash screen is displayed in less than 5 seconds after power is applied. The company name/Logo is shown on the left side and the product name on the right. See Figure 2-1.

Figure 2-1: Example of Splash Screen

System Status / Versions Screen

The system status is shown on the left screen and should show "System Pass" in green text. The version screen is located on the right side and shows the software and database version information. See Figure 2-2.

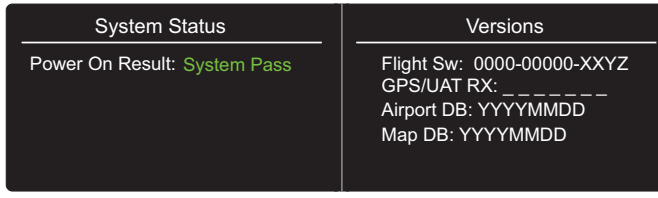


Figure 2-2: Example of System Status / Version Screens

- If System Status is "System Fail", then the message "Self-Test Failures Occurred" is shown on the right side of the display and the "System Test Failed" is heard through the aircraft audio system. The option to restart the unit or to continue start up in a degraded mode is shown on the right side of the display
  - Tap the Restart button to restart the system.
  - If the "System Fail" message continues to be seen tap the Continue button to proceed. Refer to Chap. 5 (Troubleshooting) for corrective actions.
- If System Status is "System Degraded", then the message "See Msg Window" is shown on the right side of the display.
  - Tap Continue button to proceed. Refer to Chap. 5 (Troubleshooting) for corrective actions.

Flight ID Screen (optional)

The Flight ID Screen is a configuration option that must be setup during installation of the Lynx NGT-9000. Most general aviation aircraft will be operated in a manner that does not require Flight ID. See Figure 2-3. It is shown after the System Status/Version Screen and shows the following information:

- The Tail # (call sign) button, located in the upper left, may be tapped to be activated in place of a Flight ID.
- The Flight ID Number is entered using the keypad. The keypad will change to numbers after three alpha characters are entered. When complete, tap the Done button to proceed to normal operation.
- The last Flight ID entered is shown after power is cycled.

Figure 2-3: Example of Flight ID Screen

Normal Operation

Figure 2-4 shows an example of the unit in normal operation. When the aircraft is on ground the System Test button and ON-GND indication are shown. Functional instructions are located in the Basic Operation section below.

Figure 2-4: Example of Normal Operation

BASIC OPERATION

The touch screen display is divided into left and right screens that show information specific to the selected application. The user can select, input, and adjust information on the screen using buttons, edit boxes and screen objects using gestures (actions) such as tap, momentary press, drag, or swipe.

Screen Buttons

The buttons are used to select, input, and adjust screen information. The buttons have the following common functionality:

- Buttons are typically gray background color with white or green text.
- The shape of a button can vary according it's location.
- The a button background highlights in blue when pressed.
- A button function that is inhibited has its button label grayed out.
- Buttons with an amber background color are typically inactive.

Table 2-3 provides examples of screen buttons, edit boxes, and other screen objects and their functionality.

Table 2-1: Button Functions

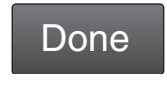
NAME - FUNCTION	EXAMPLE
Momentary Button: Use a tap action on the momentary button to perform a onetime function	
Latch Button: Use a tap action on the latch button to set a single function to On or Off. Once pressed the button retains the latched appearance indicating that it is active.	 Not Selected - Selected
Toggle Button: The toggle button is used to control related functions of which only one may be active at a time. Performs a onetime action when pressed that changes the selected indicator located at the bottom of the button. The background is blue only while pressed.	 Not Selected - Selected

Table 2-1: Button Functions (continued)

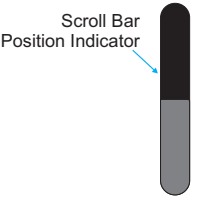
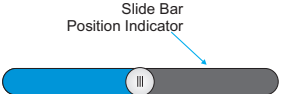
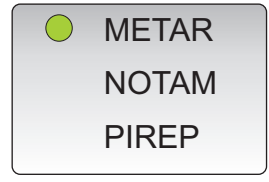
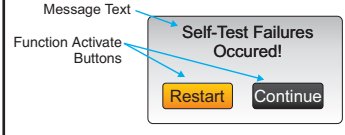
NAME - FUNCTION	EXAMPLE
Radio Button: The radio button is used to control related functions of which only one may be active. A circular indicator is located on the button that is bright green when the button function is active and is dark when not active.	 Not Selected - Selected
Options Button: The gear shaped options button is used to access options available for the application screen. Tap the button to open the list of options. The gear is blue only while pressed.	 Not Selected - Selected
Brightness Button: Used to increase or decrease the display brightness level. Tap the button to open a slide bar. The button is blue only while pressed.	 Not Selected - Selected
Scroll Bar: The scroll bar is used to navigate vertically through a list or block of text. Use a drag or swipe action to move the scroll bar.	
Slider Bar: A slider bar is used to increase or reduce a value. Use a drag or swipe action to move the slider bar.	
Options Tab: The Options Tab is comprised of at least two latch buttons and a “Done” momentary button. It is used on the application option screens to select between two “pages” of information by tapping on the desired page name on the tab.	

Table 2-1: Button Functions (continued)

NAME - FUNCTION	EXAMPLE
Selection List: Selection Lists are used where there is a list of items from which a selection can be made. A green filled circle is shown when an item is selected. A drag or swipe action is used to scroll the list up or down.	
Message Window: The message window is used when a system message is present that requires a user response. Two function active buttons can be arranged in a row below the message text.	

Application Screens

The display is divided into left and right screens with each screen having access to a particular application. An Application indicator is located at the bottom of each screen. The indicator shows the number of available applications for that side of the display as well as the current application setting. Each application can slide into view using both Drag and Swipe actions. A brief description of each application and the order it has been placed is provided in Table 2-2 and Table 2-3.

Table 2-2: Left Screen Applications

APPLICATION	INDICATOR
Transponder Displays Mode A Squawk Code, Pressure Altitude, Flight ID or Call Sign (tail number).	
Alternate Traffic Birds-eye display of traffic and own-ship compliant with the requirements of AC 20-172A and DO-317A for the purpose of supporting the Enhanced Visual Acquisition (EVAcq) and Basic Airborne (AIRB) CDTI applications.	

Table 2-3: Right Screen Applications

APPLICATION	INDICATOR
Traffic Birds-eye display of traffic and own-ship compliant with the requirements of AC 20-172A and DO-317A for the purpose of supporting the Enhanced Visual Acquisition (EVAcq) and Basic Airborne (AIRB) CDTI applications.	
FIS-B Graphic Simplified moving map display with depiction of ownship and the ability to selectively overlay graphical FIS-B products such as NEXRAD, METAR, AIRMET, SIGMETs, and TFR.	
FIS-B Graphic Winds & Temp Simplified moving map display with depiction of ownship and the ability to selectively overlay winds and temps aloft at the desired flight level.	
FIS-B Textual Data Display of airport associated textual products provided by FIS-B including AIRMET, METAR, NOTAM, SIGMET, SPECI, and TAF.	

TRANSPONDER OPERATION

The transponder receives interrogations from surrounding aircraft and from ATC and then transmits replies. The transponder application is the first screen on the left side of the display as indicated by the application indicator. See Figure 2-5 and the functional description below for operating instructions.

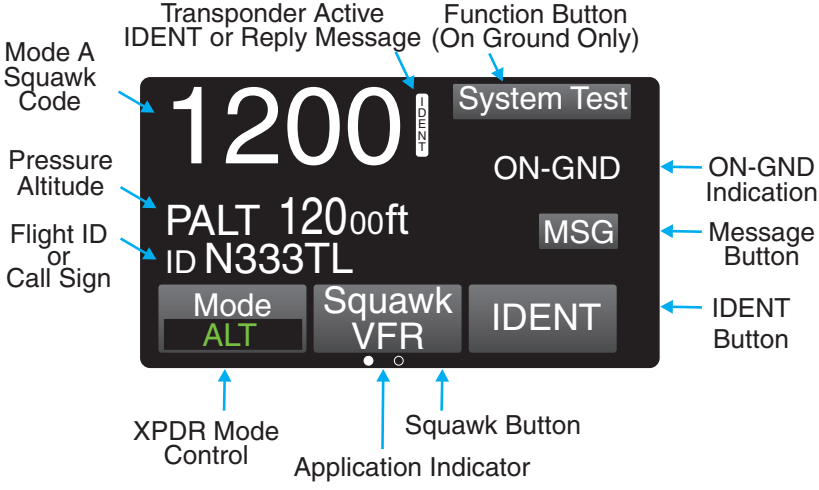


Figure 2-5: Transponder Application Screen

Squawk Code

When the Squawk Code text is tapped, the Squawk Code Edit Screen is shown. See Figure 2-6. The current Squawk Code continues to be transmitted until the last digit of the new Squawk Code is entered. The edit mode is cancelled by tapping the Squawk Code before the fourth digit is entered, or after 5 seconds of inactivity, or if a TAS alert occurs.

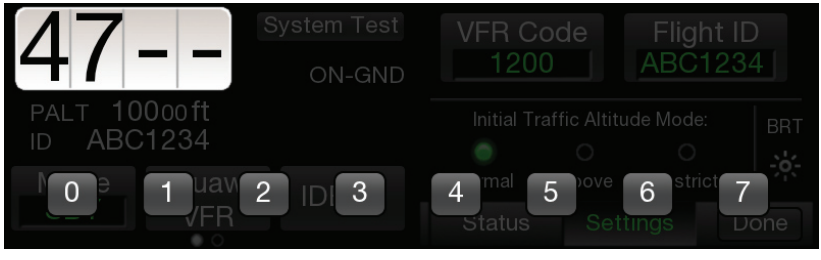


Figure 2-6: Squawk Code Edit Screen

Current Pressure Altitude

The current pressure altitude (PALT) is located below the Squawk Code. A value greater than 99,000 ft will set the value to 99900 with amber text. An invalid pressure altitude is shown as amber dashes.

Flight ID / Call Sign

The Flight ID or Call Sign (tail number) is located below the PALT. During initial installation either the tail number is setup to be shown or the Flight ID can be set each flight using the Flight ID screen (configuration option).

Mode Control

The Mode Control toggle button has the following selections: Standby (SBY), On (ON), and Altitude (ALT).

- Selecting **Standby** stops all transponder transmission.
- Selecting **ON** puts the transponder in ATC mode A in which it replies to interrogations, but does not report the plane's altitude.
- Selecting **ALT** put the transponder in ATC mode C. When the aircraft is In-Air the transponder replies to interrogations and includes the plane's pressure altitude in the replies.
  When On-Ground, the display includes an "ON-GND" indication. While On-Ground the transponder does not reply to All-Call interrogations and outputs ADS-B at a slower surface rate.

A "FAIL" message, in amber text, is shown if a transponder failure is detected.

Transponder Reply

When the transponder (XPDR) reply is active an "R" indicator is shown to the right of the Squawk Code. The "R" is replaced with "IDENT" when the IDENT button is tapped.

IDENT Button

Tap the IDENT button to transmit the Special Identification (SPI) pulse. An IDENT pulse highlights the aircraft's symbol on the ATC's radar screen and is identified on the screen next to the squawk code.

Squawk VFR Button

Tap the Squawk VFR toggle button to change the transponder squawk code to a predefined (1200) VFR value. The value shown on the button is the code that is activated when the button is tapped. A second press reverts the transponder to the previous squawk code.

MSG Button

If a new message is available a flashing MSG button is shown on the left screen. Tap the MSG button to view fail or degraded messages during normal operation.

Once the messages in the message window have been viewed, the MSG button will stop flashing. When all messages have cleared, the MSG button is removed from the screen. On the Message window tap the Done button to return to the previously viewed screen.

Refer to the Chap. 5 (Troubleshooting) for corrective actions.

ON-GND Indicator

The ON-GND indicator provides the pilot a notification that the transponder is operating in the on-ground mode (does not reply to all-calls).

System Test Button

The System Test button is available only when the aircraft is on the ground. Tapping the button initiates the Test. During the System Test the user functions are disabled and the right screen shows a preset traffic display with the message “Self Test In Progress” at the top of the screen. See Figure 2-7.

The left screen shows the system affect of the tests results on the functional areas of the system.

Note – Functions that are not part of the installation are not shown.

Note - Individual test failures are recorded in the fault log. (Accessible to service personnel only.)

The unit returns to normal operation if no failures are detected within 5 seconds.

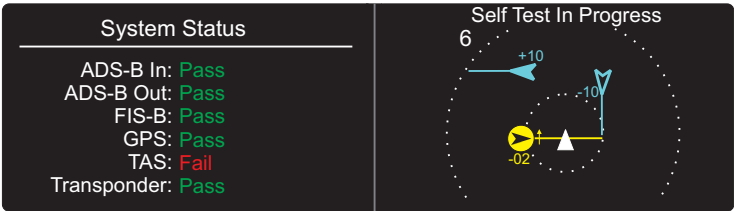


Figure 2-7: Example of System Test Screen

- If a “Fail” or External Fail” is shown for any of the system functions, then the message “Self-Test Failure” is shown on the right side of the display as well as the option to restart the unit or to continue operation in a degraded mode.
  - Tap the “Restart” button to reset the unit and once it is operational, perform the System Test again. If the failures continue tap the “Continue” button to proceed in a degraded operational mode.
- If “Degraded” is shown for any of the system functions, then the message “Service Unit Soon” is shown on the right side of the display.
  - Tap Continue screen button to proceed.

Correct failures before going any further with the functional check.

Note: It is normal to show degraded for certain functions if some aircraft systems are still aligning, or if the GPS has not yet acquired a signal.

- On the Transponder Screen, tap the “MSG” button located on the Transponder Application screen to view fail messages.
- Check signal availability when failures for ADS-B In, FIS-B, GPS, or TAS are noted.
- Refer to the Chap. 5 (Troubleshooting) for corrective actions.

TRAFFIC OPERATION

The Lynx MultiLink Surveillance System monitors the airspace around the aircraft using ADS-B In (and TAS if equipped) to communicate with like equipped aircraft with ADS-B Out and shows these other aircraft on the screen. When within range of a participating ground station TIS-B and ADS-R traffic services are also shown on the screen. Traffic is identified on the screen using corresponding traffic symbols. Refer to the descriptions below for detailed information.

Limitations

1. The ADS-B, ADS-R, TIS-B, and TAS traffic information assists the pilot in visually acquiring traffic while airborne and is expected to improve both safety and efficiency by providing the pilot with enhanced traffic awareness. This functionality does not relieve the pilot of “see and avoid” responsibilities as described in 14 CFR 91.113b.
2. Traffic information shown on the Lynx NGT-9000 is dependent on other aircraft having similar ADS-B equipment, or a Mode A/C transponder for models with TAS, or being in range of a ground station that provides TIS-B and ADS-R. If another aircraft cannot meet these requirements, then the other aircraft will not be displayed on the Lynx NGT-9000.
3. The EVAcq and AIRB functions are unavailable when ownship position is beyond 85 degrees North or South latitude. The result is a display of “Traffic Unavailable” on Panel mount units and an indication of “Standby” for remote displays. However, for NGT-9000 installations, where TAS is enabled, the range/bearing based TAS targets are displayed.

Traffic Screen

The traffic screen has a black background. Transponder Mode can be set to Standby (SBY), On (ON), or Altitude (ALT).

The Traffic application is available on both the left and right screen. The Traffic information is shown if ADS-B or TAS data is valid.

A “Traffic Failed” is displayed if both ADS-B and TAS (optional) are failed. “Traffic Unavailable” is displayed if ADS-B In has no heading or track available and TAS (if installed) is in standby. See Figure 2-8 for an example of Traffic Screens. Refer to the Functional Description below for detailed information.

Ownship Symbol

The ownship is shown as a white triangle on the traffic display. When ownship direction source is not valid the ownship symbol is a white circle with a black inset. Ownship orientation matches ownship heading when available or track angle if heading is not available.

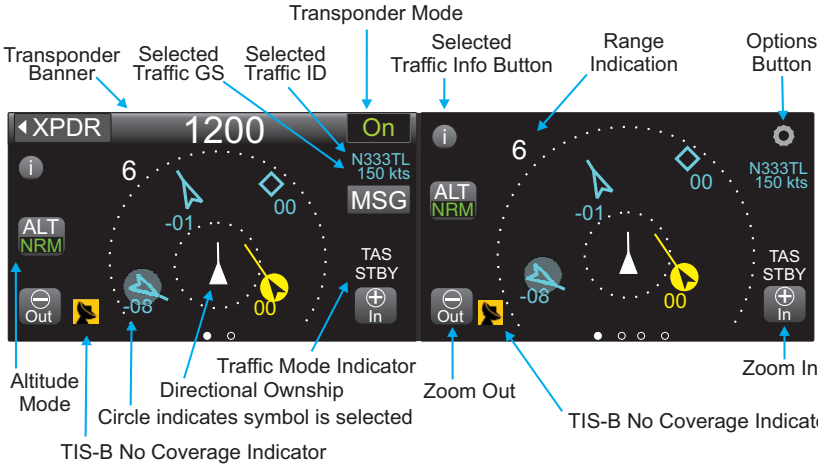


Figure 2-8: Traffic Applications Screen

Traffic Symbols

The traffic symbols indicate the approximate range, relative bearing, and relative altitude of intruder aircraft. Traffic data with directional data for intruder aircraft are shown as arrowheads. Traffic data without directional data for intruder aircraft are shown as diamonds.

- A solid amber circle (or with a black filled arrowhead) is a Traffic Advisory (TA) that represents an intruder aircraft that may pose a collision threat. (A semi-circle at the edge of the display represents an off-scale TA).
- Traffic Advisory symbols only appear on NGT-9000+ or NGT-9000R+ that include the optional TAS feature. TAS functionality also has aural TA warnings (“traffic, traffic”) that are annunciated over the cockpit speaker or headset. NOTE - Optionally available extended call-outs including the clock position, relative attitude and range (10 o’clock, low, 5 miles). This is a configurable option selected at the time of installation.
- A solid diamond or arrowhead is a Proximity Advisory (PA) that represents traffic that is close but does not pose an immediate collision threat.
- A hollow diamond or arrowhead indicates Other Traffic (OT) that represents traffic that does not pose an immediate threat.
- Directional intruders are oriented such that symbols point in the direction of their reported heading or track, relative to own aircraft direction.

- A velocity vector arrow may be appended to the right side of a traffic symbol to indicate that the intruder aircraft is ascending (up arrow) or descending (down arrow) faster than 500 fpm. No arrow is shown for intruder aircraft in level flight, or for those moving vertically slower than ±500 fpm, or for non-altitude-reporting intruder aircraft.
- A two digit number may be appended to traffic symbols to indicate, in hundreds of feet, the relative altitude of the intruder. For example +03 means the intruder aircraft is 300 ft above ownship. A positive data tag is displayed above the traffic symbol to emphasize that the intruder aircraft is above your aircraft. A negative data tag is displayed below the traffic symbol. If the intruder is at the same altitude as your aircraft, “00” is displayed below the traffic symbol. The data tag for a vertically out of range TA displays the relative altitude of the intruder regardless of the current vertical display mode. Only display data tags for altitude reporting aircraft are shown. Non-altitude reporting aircraft are considered to be at the same altitude as ownship.
- Tapping a traffic symbol generates a circle around it indicating that the traffic symbol is selected. In addition the following is displayed: Selected Traffic Info Button, Selected Traffic ID, and if enabled the Selected Traffic Ground Speed (GS). Tap the traffic symbol again to remove the circle and data.
- When TAS functionality is enabled and in installations with no heading source, the TAS traffic (referenced to heading) and ADS-B traffic (referenced to track) are displayed simultaneously. The ADS-B targets will therefore appear skewed by the crab angle of the aircraft.
- When TAS functionality is enabled and in Rotorcraft installations with no heading source, low speed operations (< 7 knots) will result in a removal of the ADS-B tracks because ownship track can not be adequately determined. TAS Only text will appear on the display.

See Table 2-4 for a list and description of traffic symbols.

Traffic Display Priority

When multiple intruders are displayed, some overlapping of symbols and/or data may occur. In these instances, the intruder with the greatest threat partially or completely overlaps the intruders that pose lower threats. Threat levels are calculated based on the intruders’ proximity, heading, altitude, and speed.

Zoom Buttons

Zoom In (+) and Zoom Out (-) buttons are located on the bottom of each traffic screens. The buttons are used to change the traffic display range.

Table 2-4: Traffic Symbols

SYMBOL	DESCRIPTION - EXAMPLE
	Airborne Directional Traffic Advisory (TA) (Panel mount with TAS option only)
	Airborne Directional Proximity Advisory (PA) * (Panel mount with TAS option only)
	Airborne Directional Other Traffic (OT) * (Panel mount only)
	Airborne Non-directional (TA)
	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.

Range Rings

The range rings are oriented around the ownship. A range indicator is shown outside the upper left corner of the outer most ring. Bearing indicators are shown on the 2 nm range ring. The range ring setting is controlled by the zoom buttons.

The Traffic screen has the following display range with additional inner rings as noted:

- Range 40 has 40 nm and 24 nm range rings.
- Range 24 has 24 nm and 12 nm range rings.
- Range 12 has 12 nm and 6 nm range rings.
- Range 6 has 6 nm and 2 nm range rings.
- Range 2 has only the 2 nm range ring.
- Range 1 has only the 1 nm range ring.
- Range 0.5 has only the 0.5 nm range ring.

Traffic Altitude Mode

The available Traffic Altitude Modes are shown on a Toggle button with green text. The altitude ranges are in relation to the ownship. A description of each mode is detailed below:

- Normal (NRM): Traffic is displayed from altitudes of between -2,700 and +2,700 ft. This mode is typically used during the enroute phase of flight to reduce screen clutter.
- Above (ABV): Traffic is displayed from altitudes of between +9,000 and -2,700 ft. This mode is typically used during takeoff.
- Below (BLW): Traffic is displayed from altitudes of between +2,700 and -9,000 ft. This mode is typically used during approach and landing.
- Unrestricted (UNR): Traffic is displayed from altitudes of between +9,900 and -9,900 ft. This mode is typically used during the enroute phase of flight to show all aircraft within the entire detection area.

The Altitude Mode button is available only when the status of the aircraft is In-Air. When the aircraft status is On-Ground the altitude mode button is replaced with the TFC button.

See Figure 2-8 for a graphic representation of the Traffic Display Modes and Traffic Zones.

TFC Button

The Traffic (TFC) button replaces the Altitude Mode button when the status of the aircraft is On-Ground. The button also activates TAS (optional) when the aircraft is On-Ground. A description of each mode is detailed below:

- Ground (GND): The display shows ground traffic only and places TAS (if installed) in Standby. Standby indication is shown on the Traffic Mode Indicator.
- Air (AIR): The display shows air traffic only and activates TAS (if installed).
- All (ALL): The display shows air and ground traffic and activates TAS (if installed).

Note

When no heading source is available and when going through low speed operations (< 7 knots), ADS-B tracks are removed because ownship track can not be adequately determined. If TAS is not active, a “Traffic Unavailable” message is displayed.

Transponder Banner

When the traffic application is displayed on the left screen, the transponder banner is displayed at the top of the left screen with the following information:

- Quick return button is labeled “XPDR” and is used to return to the Transponder Application screen
- Mode A squawk code
- Reply “R” or Ident “ID” indicator shown to the right of the squawk code when either function is active.
- Current transponder operating mode status indicator with green text. An amber “XPDR Failed” is shown when the transponder function has failed.

MSG Button

The MSG Button seen on the Traffic Screen has the same functionality as the one shown on the Transponder screen. See page 2-10 for details.

Traffic Mode Indicator

The Traffic Mode Indicator is available only when a Lynx NGT-9000 with TAS is installed. Otherwise the “ADS Only” is assumed to be operating for non-TAS installs.

The indicator is shown above the Zoom in (+) button. The possible modes of operation are detailed below:

- TAS STBY: This mode is shown if the TAS is in standby.
- TAS Only: This mode is shown if the TAS is operating.
- ADS Only: This mode is shown if TAS has failed (or not available) and ADS is operating.

A “Traffic Failed” message is shown with amber text when all available traffic functions have failed. This results in all the traffic symbols being removed from the traffic screen.

A “Traffic Unavailable” is shown with amber text when insufficient information is available to display traffic. This results in all the traffic symbols being removed from the traffic screen.

Traffic Options Button

The gear shaped Options Button is located in the upper right corner of the right application screen. Tap the button to open the options screen.

Traffic Options Screen

Three latch buttons are located on the bottom. The Status button opens a screen showing GPS satellite information. The Settings button opens a screen allowing the setting of Initial Traffic Altitude Mode, VFR Squawk Code, Display Brightness Trim, and Flight ID (if configured). Tap the Done button to close the Options Screen.

Options - Status

See Figure 2-10. The status screen provides the following GPS information:

- 24 Bit ICAO ID (Mode S Identifier): This value is displayed in octal format.
- NACp (Navigation Accuracy Category for Position): This value is determined using HFOM data.
- NIC (Navigation Integrity Category): this value is determined using HPL data.
- Navigation Solution Mode (GPS), possible indications are:
  - “No Pos” - unknown or DR [Insufficient Satellites to compute a position]

- "2D" - 2D Nav, no integrity [Sufficient satellites to compute a lateral position, but not to compute either HPLSBAS or HPLFD]
- "3D" - 3D Nav, no integrity [Sufficient satellites to compute a lateral and vertical position, but not to compute either HPLSBAS or HPLFD]
- "FDE" - RAIM/Alt (aided integrity) [HPLFD computed using barometric altitude aiding is valid]
- "WAAS" - RAIM [HPLSBAAS is valid or HPLFD computed without using barometric altitude aiding is valid]
- "Error" - SVERROR (trying to exclude) [Fault detection detects a position failure which cannot be excluded within the time-to-alert when integrity is being provided by FDE]

- SIL: This value is always 3. Displayed GPS Satellite information is shown as horizontal bars in increasing numerical order. The bars are green-filled for greater signal strength and gray-filled when no signal is detected. The bars should be at least 40-50% green-filled .
- Latitude and Longitude data: Shows the GPS computed own aircraft latitude/longitude in degrees, minutes, seconds.
- GPS Altitude (GALT): Shows the GPS computed own aircraft altitude (Height Above Ellipsoid (HAE) in feet.
- HFOM (Horizontal Figure of Merit): An indication of the quality of the GPS position for horizontal position data.
- VFOM (Vertical Figure of Merit): An indication of the quality of the GPS position for vertical position data.

If no valid data is available for the GPS data a white dash is inserted.

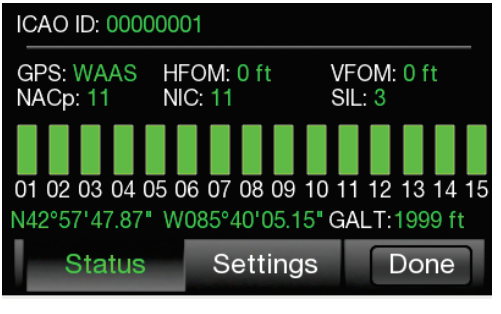


Figure 2-10: Traffic Options Screen - Status

Options - Settings

The Settings screen provides the following information and functionality: See Figure 2-11.

- Radio buttons to set the traffic altitude mode (Normal, Above, and Unrestricted). This selects the default altitude mode used when the aircraft goes in-air. This is also used as the altitude mode when on the ground and the “TFC” button has selected “AIR” or “ALL”.
- Display Brightness Trim button is used to open a slide bar to adjust the screen brightness up or down from the automatic brightness control setting. This is trim adjustment not a 0 to 100% control.
- The VFR Code button is a means to update the default VFR code to use when the “Squawk VFR” button is pressed on the transponder application screen. Tap the button to go to a VFR Code edit screen to set a new VFR code. NOTE: This should be set to 1200 for use in the USA.
- A Flight ID toggle button is shown if configured. Tap the button to open the Flight ID Edit screen.

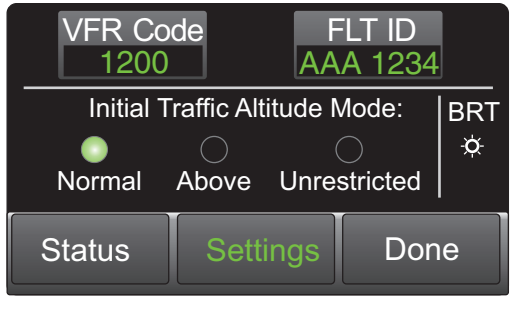


Figure 2-11: Traffic Options Screen - Settings

Selected Traffic Info Button (i)

The selected traffic info button appears on the left side of both the left and right screen after a traffic symbol is pressed. When the button is tapped a traffic information window is shown over the top of the traffic screen.

TIS-B No Coverage Indicator

When configured to be enabled, the indicator is located next to the Zoom Out button and is shown when TIS-B / ADS-R data is not available in the area (i.e. out of range of a ADS-B ground station).

- The indicator is also shown if a problem exists with the NGT-9000 System. See the troubleshooting section.
- The indicator will not be shown when TAS (if installed) is operational (i.e. installed, not failed, not in standby).

Traffic Information Window

The window is shown over the traffic screen and provides the following data and functionality:

- Flight ID of the selected aircraft.
- Emitter Category or “type” of aircraft.
- An aircraft Icon is shown on the right side of the window showing a representation of the aircraft being tracked. A question mark is inserted if no icon for that type of aircraft is available.
- Calculated ground speed of the selected aircraft.
- A Display GS Latch button is used to activate the selected Traffic GS on the traffic screen.
- Tap the Done button to close the window. The window is also removed from the screen if a Traffic Advisory is detected.
- See Figure 2-12 for an example of the Traffic Information Window.

Figure 2-12: Example of Traffic Information Window

Selected Traffic ID

The Selected Traffic ID appears along the right side of both screens after a traffic symbol is pressed. The Traffic ID is removed when the selected traffic symbol is tapped, a Traffic Advisory (TA) occurs, or if the selected traffic is no longer being tracked. The Traffic ID is restored to the screen if the Traffic Advisory is no longer present and if no other user action (i.e., selecting a different traffic symbol, tapping a button, or changing the zoom range) has occurred since the Traffic Advisory occurred. See figure 2-8.

Selected Traffic GS

The Selected Traffic GS (if configured) appears along the right side of both screens (under the selected traffic ID) after a traffic symbol is pressed. The Traffic GS is removed when the selected traffic symbol is tapped, a Traffic Advisory (TA) occurs, or if the selected traffic is no longer being tracked. The Traffic GS is restored to the screen if the Traffic Advisory is no longer present and if no other user action (i.e., selecting a different traffic symbol, tapping a button, or changing the zoom range) has occurred since the Traffic Advisory occurred. See figure 2-8.

True Track (TRK)

This indication is shown on the lower right side of the traffic screen when a heading source is configured as an input, but the heading source is not operational.

WEATHER OPERATION

Flight Information Service Broadcast (FIS-B) service is available only from a ground station that is in range to aircraft equipped with UAT receivers. The FIS-B broadcast provides a graphical and textual display of weather and aeronautical information. Alternate weather displays and PED's may show the weather data differently than what is shown in this pilot's guide. Refer to the display operation manual or PED application information for details.

The FIS-B data is typically shown in three different ways: Graphical weather, Graphical Winds & Temp Aloft, and Textual. This information is detailed below. The map orientation is typically shown as north up.

FIS-B No Coverage Indicator

When configured to be enabled the indicator is located at the bottom center of the screen and is shown when No FIS-B data is available in the area (i.e. out of range of a ADS-B ground station).

- The indicator is also shown if a problem exists with the NGT-9000 System. See the troubleshooting section.

When configured to be disabled the Winds & Temps and FIS-B textual data screens are deactivated and the FIS-B No Coverage Indicator is disabled.

When configured for Auto FIS-B, the Winds & Temps and FIS-B textual data screens are initially deactivated and the FIS-B No Coverage Indicator is disabled. The Winds & Temps and FIS-B textual data screens are activated and the FIS-B No Coverage Indicator enabled when FIS-B weather messages have been detected. When FIS-B is in operation a button is present on the screen that is used to disable/enable FIS-B function. See Figure 2-13.

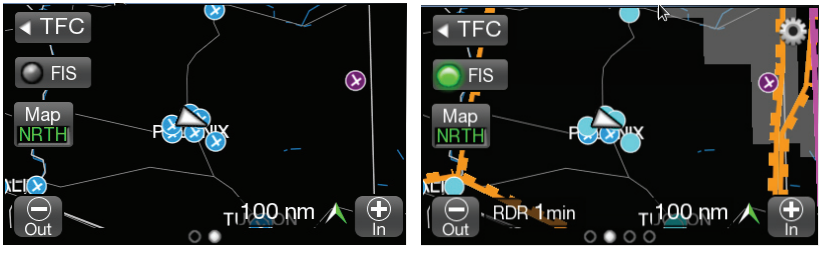


Figure 2-13: FIS Button

FIS-B Graphical Weather Application

The Graphical Weather Application is located in the second screen position as indicated by the Application Indicator. The Graphic Application is a simplified moving map with depiction of ownship and the ability to selectively overlay graphical FIS-B products such as AIRMET, NEXRAD, TFR, METAR, and SIGMET. See Figure 2-14.

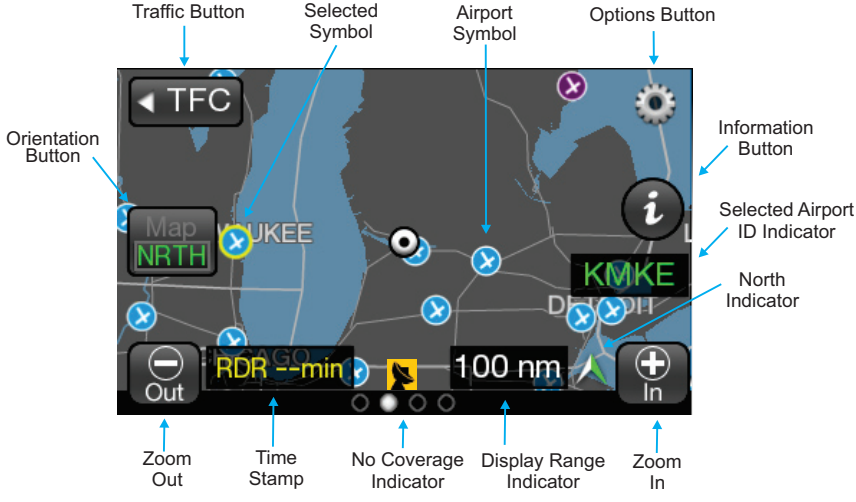


Figure 2-14: Weather Map

Map Elements

FIS-B weather products are overlaid on the map. The viewing of weather products is controlled by the declutter range selected on the Options Screen.

- Tap to select Product overlaid map elements.
- The selected map elements are highlighted in a yellow outline.
- A tap of an empty area of the map de-selects the map element.
- Only one map element can be selected at a time and may be selected when panning is active or not.
- The map is normally centered on the ownship symbol when panning is not activated. When panning is active the viewing area is repositioned to that selected by the pilot.
- The directional ownship symbol is a white triangle that is a reference point that corresponds to the ownship position.
- The ownship symbol is a white circle if direction data is not known.

- The land masses are black. Bodies of water are dark blue. Depiction of NEXRAD weather radar data is overlaid on the map. Map areas where NEXRAD data has not been received are indicated using a gray semi-transparent graphical overlay. This will cause land masses to appear grey and water to appear light blue.
- Country and State borders are solid light gray lines.
- Major roads are depicted as solid gray lines for display ranges less than or equal to 200 nm.
- Cities are shown on the map in small white text centered on the cities location. The display ranges of cities are dependent on the size of the city as follows: Large and medium sized cities are shown at less than or equal to 200 nm. Small cities are shown at less than or equal to 50 nm.
- The symbol for the different types of airports are described in Table 2-5. Soft surfaced airports are shown at display ranges less than or equal to 10 nm. Hard surfaced small airports are shown at display ranges less than or equal to 20 nm. Hard surfaced large airports are shown at display ranges less than or equal to 200 nm.

Information Button (i)

The Information button is shown on the screen, located on the right side of the screen, after a map element is selected. The button is gray in color and labeled with an “i” icon. Tap the button to show the Weather Map Text screen on the left side of the screen.

TFR Map Elements

Temporary Flight Restrictions are displayed on the map as a solid red line. A TFR is shown as a solid orange line up to 12 hours prior to the effective date and time of the TFR.

AIRMET and SIGMET Map Elements

AIRMET and SIGMET are weather advisories with concise descriptions of weather conditions in an area. The AIRMET are used for less severe weather then the SIGMET. The type and graphic description are detailed below:

Table 2-5: Airport Symbols

DESCRIPTION	SYMBOL
Towered Soft Surfaced Airport	
Non-towered Soft Surfaced Airports	
Towered Hard Surfaced Small Airports (1,500 to 8,069 ft runway)	
Non-towered Hard Surfaced Small Airports (1,500 to 8,069 ft runway)	
Towered Hard Surfaced Large Airports (> 8,069 ft runway and some multi-surfaced < 8,069 ft runways)	
Non-towered Hard Surfaced Large Airports (> 8,069 ft runway and some multi-surfaced < 8,069 ft runways)	

AIRMET TYPE	DISPLAY PROPERTIES	
Icing	Straight hashed blue line	
Turbulence	Straight hashed orange line	
Mountain Obscuring	Straight hashed magenta line	
IFR	Straight hashed purple line	
Unknown	Straight hashed blue line	

SIGMET TYPE	DISPLAY PROPERTIES	
Icing	Straight hashed Red line	
Turbulence		
Convective		
Volcanic Ash		
Other		

METAR

METAR is a report of weather conditions at airports represented graphically and consists of the FAA Flight Rules and Weather Conditions. The flight rules icons shows the FAA flight rules for each airport based on the visibility and cloud cover conditions. The weather conditions icons indicates the weather conditions at each airport based on precipitation, winds, and visual obstructions. The type and graphic description are detailed below:

FLIGHT RULES	DISPLAY PROPERTIES
VFR	Filled cyan circle
MVFR	Filled green circle
IFR	Filled yellow circle
LIFR	Filled magenta circle
Unknown	Filled grey circle

NEXRAD Map Elements

NEXRAD provides data on precipitation and its intensity in the form of a composite mosaic image. See Figure 2-15. NEXRAD information extends to approximately a 75 nm radius of the ownship, and is only updated every 5 minutes. Note - Freezing precipitation colors (pink/blue) are not provided.

The age of the NEXRAD data is shown in the lower left corner of the screen with yellow text. The time stamp is labeled with “RDR” and “min”. Dashes replace the time stamp when no NEXRAD image data is available.

CONUS Map Elements

CONUS information covers the Continental United States. It is only updated every 15 minutes.

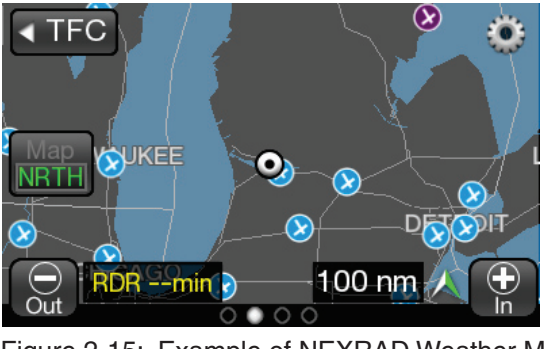


Figure 2-15: Example of NEXRAD Weather Map

Traffic Button

This button is located on the far left side of the screen and is labeled “TFC” with a left facing triangle. Tap the button to return to the Traffic Application screen.

Zoom Buttons

Zoom In (+) and Zoom Out (-) buttons are located on the bottom of screen. The buttons are used to change the display range shown on the display. Display range options for the Graphic Application screen are 10 (minimum), 20, 50, 100, 200, 400, and 800 (maximum).

Display Range Indicator

This indication is a readout of the selected display range and is located in the lower right corner of the display.

Panning

Press and hold an area of the screen that is not a button for 1 second to activate the Panning function. Drag across the map to move the map in that direction. Tap the Cancel Pan button to inactivate the panning function.

North Indicator

This indication is a white/green arrow located in the lower right corner of the display. The indicator points to the top of the display when the application is oriented north up and points true north when the application is oriented track up.

Airport ID Indicator

The airport ID is shown on the screen, located below the Information button, after an airport map element is selected.

Orientation Button

This toggle button is located on the left side of the screen is labeled “Map”. The button has two selections “NRTH” which is north up and “TRK” which is track up. The lower half of the button shows the current map orientation in green text.

The north up orientation has the ownship position in the center of the map screen.

The track up orientation has the ownship centered horizontally but moved down to the lower one third of the screen (this orientation provides a longer look ahead in the direction of travel).

The map defaults to North Up orientation if ownship position data is not valid.

Map Options Button

The gear shaped Options Button is located in the upper right corner of the map screen. Tapping the button opens the Options screen that has three latch buttons located on the bottom of the screen. These buttons are labeled ON/OFF, Declutter, and Done.

Tap the Done button to close the Options Screen.

On/Off Option Screen

The ON/OFF screen has Toggle On/Off buttons for the FIS-B products and a Legend. A green LED indicates that the button and function is On. See Figure 2-16.

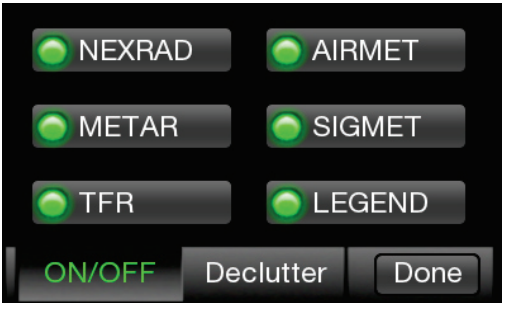


Figure 2-16: On/Off Options Screen

Weather Map Legend Screen

The Legend screen is located on the left screen and is shown after the Legend button in the On/Off screen is tapped. The screen has a banner on the top of the screen above the left display area. See Figure 2-17.

Banner

The Banner is shown on the top of the screen having a gray background. The banner provides the following information:

- Done button used to return to the previous screen.
- Mode A squawk code indicator.
- Reply “R” or Ident “ID” indicator shown to the right of the squawk code when either function is active.
- Current transponder operating mode status indicator with green text. An amber “Fail” is shown the transponder function as failed.

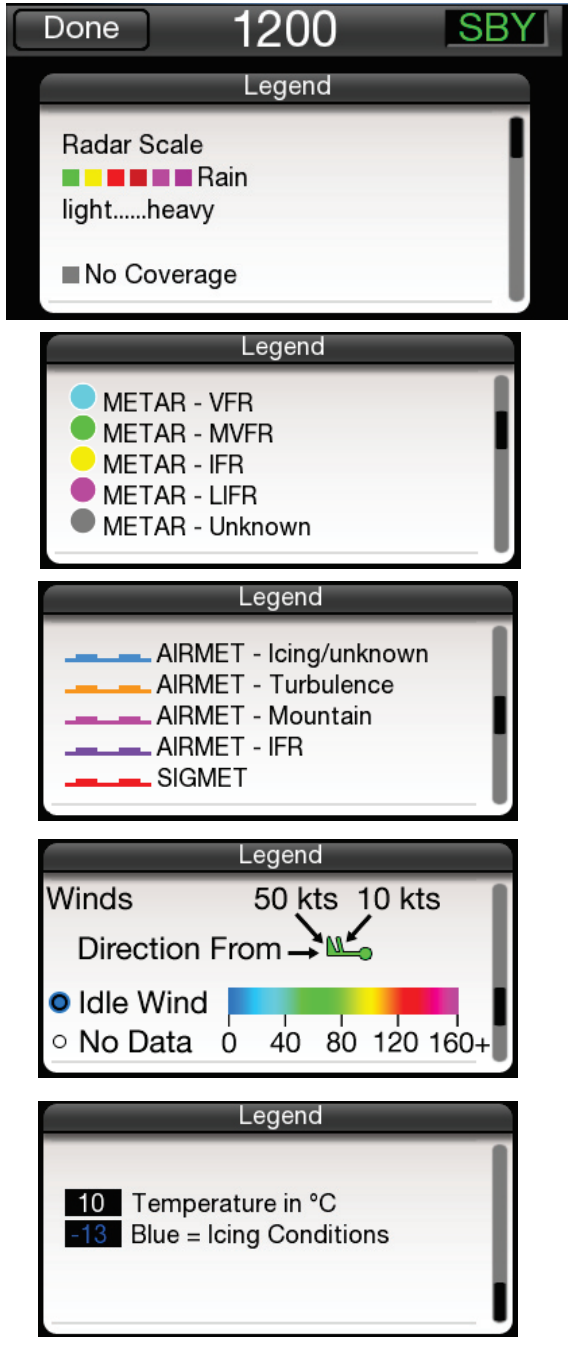


Figure 2-17: Weather Map Legend Screen

Display Area

The left display area is used to show the meaning of map elements provided by FIS-B products. It is identified with the label “Legend”. A scroll bar on the right side provides an indication that additional information can be seen by using an up/down drag action.

Declutter Option Screen

The declutter screen has a banner at the top of the screen that is labeled with the declutter range scale from 10 to 800.

The Declutter setting sets the zoom range when a product is displayed/ removed from the display.

The display area shows the declutter list of the different products (NEXRAD, METAR, TFR, AIRMET, and SIGMET). LED indicators show declutter ranges for each product. The selected list item is highlighted in white. Use the Zoom buttons to increase and decrease the layer range. Use a slide action to scroll up and down the product list. The example in figure 2-18 would indicate that NEXRAD information would be displayed up to the 400 nm range.

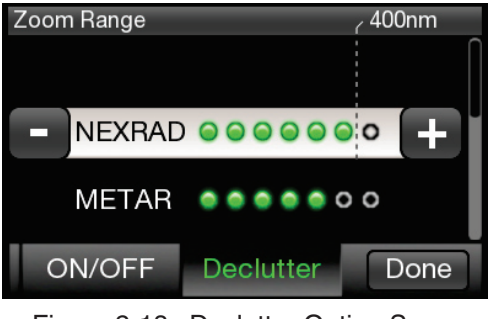


Figure 2-18: Declutter Option Screen

Weather Map Text Screen

The Weather Map Text is shown on the left screen after the Information button is tapped. The screen is removed from view when another application is activated on the right screen or if the selected map element is deselected. See Figure 2-19.

Display Area

The left display area is used to show text report data from the selected map element.

Figure 2-19: Weather Map Text Screen

Banner

The Banner is shown on the top of the left screen having a gray background The banner provides the following information:

- Done button used to remove the Weather Map Text screen and return the left side application screen.
- Mode A squawk code.
- Reply “R” or Ident “ID” indicator shown to the right of the squawk code when either function is active.
- Current transponder operating mode status indicator with green text. An amber “Fail” is shown the transponder function as failed.
- Product Select button opens a Product Select window. The button is displayed only when the selected display element is an airport. See Figure 2-20.

If selected product text data report is not available, the display area indicates this by displaying the selected product with a “not available” message.

Product Select List Window

The window shows a list of product types to select. Tapping the item will select the product type. Only one product type can be selected at a time. The available product are METAR, TAF, and NOTAM. Use a slide action to scroll the window up and down. Tap the item in the list to select. A selected item is indicated by a green indicator.

Tap the Done button to close the window and return to the Weather Map Text screen. The selected product will now be displayed on the Weather Map Text screen. If data for that product type is not available, the message “not available” is displayed.

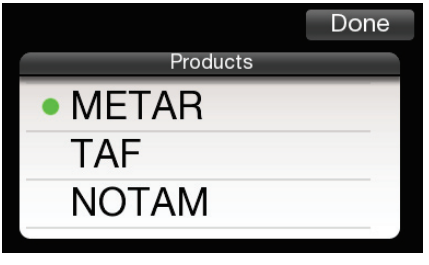


Figure 2-20: Product Pick List Window

FIS-B Graphic Winds & Temp Application

The Graphical Winds and Temperature Application is available on the right screen and is located in the third screen position as indicated by the Application Indicator. This application screen displays graphical wind and temperature aloft information obtained from FIS-B products. The aloft map orientation is shown as north up. See Figure 2-21.

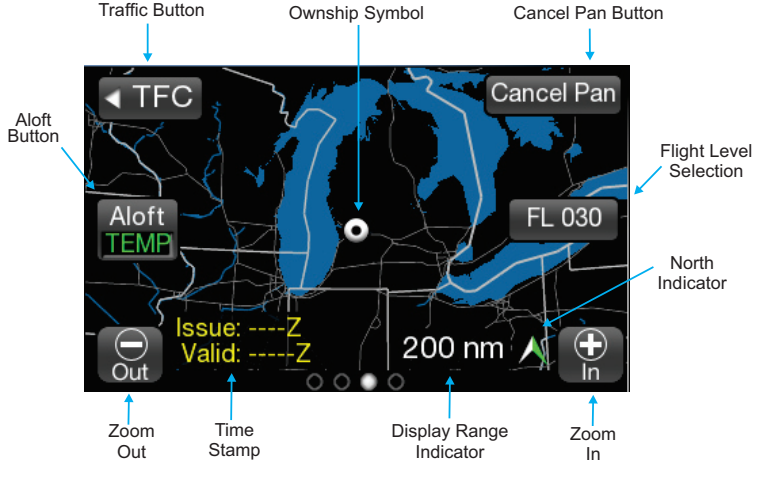


Figure 2-21: Aloft Map Screen

The winds aloft display properties are defined in Figure 2-22.

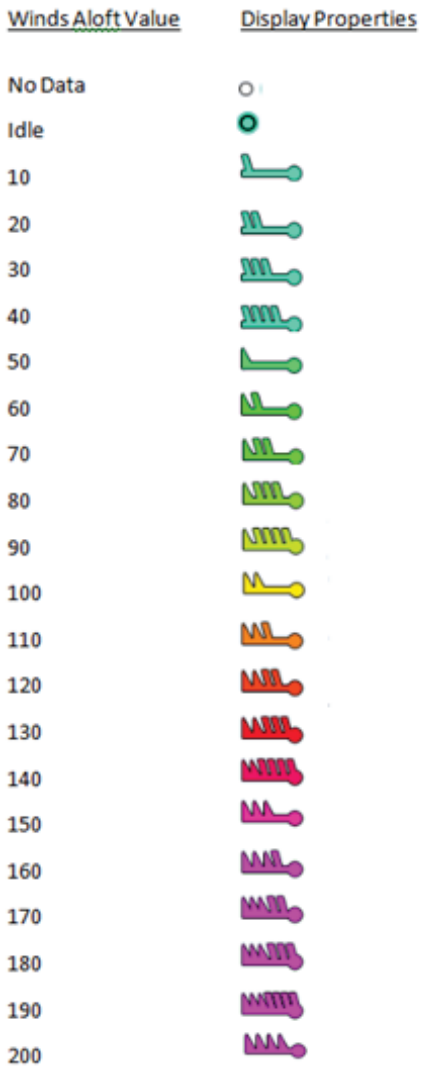


Figure 2-22: Winds Aloft Map Elements

Traffic Button

This button is located on the far left side of the screen and is labeled “TFC” with a left facing triangle. Tap the button to return to the Traffic Application screen.

Aloft Button

This button is located on the left side of the screen and is labeled “Aloft” with white text and the active selection labeled either “Wind” or “Temperature” with green text. Tap the button to select the other screen function.

Panning

Press and hold an area of the screen that is not a button for 1 second to activate the Panning function. Drag across the map to move the map in that direction. Tap the Cancel Pan button to inactivate the panning function.

Zoom Buttons

Zoom In (+) and Zoom Out (-) buttons are located on the bottom of screen. The buttons are used to change the display range shown on the display. Display range options are 10, 20, 50, 100, 200, 400, and 800.

Issue Valid Time Indication

This indicator is located at the bottom of the screen and is shown with green text when a valid time is shown. The text is shown with yellow text when the data is not valid or available.

Ownship Symbol

The ownship is shown as a white triangle when heading or track is valid. When ownship direction source is not valid the ownship symbol is a white circle with a black inset.

North Indicator

This indication is a white/green arrow located in the lower right corner of the display. The indicator points to the top of the display when the application is oriented north up.

Flight Level Selection

This is a vertical array of altitudes which is shown when the altitude is pressed. Selection is done by tapping the screen on the value desired. The values are in hundreds of feet.

When transitioning from one region to the other and the currently selected flight level is not supported in the new region, the selected flight level is reset to one that is supported.

FIS-B Textual Application

The Textual Application is available on the right screen and is located in the fourth screen position as indicated by the Application Indicator. This application screen displays textual weather information products for selected airports provided by FIS-B. The products available are METAR (Meteorological Aviation Report), NOTAM (Notice to Airmen) , and TAF (Terminal Area Forecast). See Figure 2-23.

Display Area

The display area is used to show text report data from the selected Product.

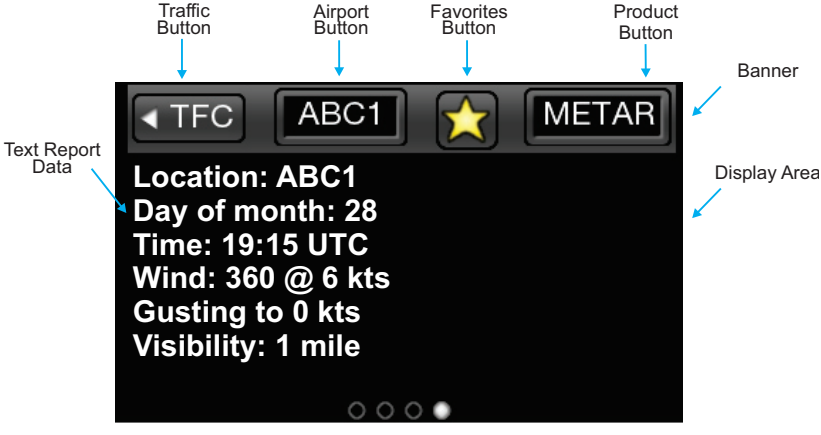


Figure 2-23: FIS-B Textual Application

Banner

The banner is located above the display area. The banner contains buttons to return to the Traffic Application screen, open the Edit Airport ID window, open the Favorites Pick List window, and a button to open the Product Pick List window.

Traffic Button

This button is located on the far left side of the banner and is labeled “TFC” with a left facing triangle. Tap the button to return to the Traffic Application screen.

Airport Button

This button is located to the right of the Traffic button is labeled with the Selected Airport identifier. This information is also shown below in the display area. Tap the button to open the Edit Airport ID window.

Edit Airport ID Window

This window is used to enter an Airport ID that is shown on the airport button and the display. See Figure 2-24.

- Use the keyboard to enter the three or four character alpha-numeric Airport ID in the airport edit box
- Tap the Cancel button to close the window without changing the current Airport ID.
- Tap the Add to Favorites button (star plus icon) to add the current Airport ID to the Favorites Pick List. The Favorites Pick List has maximum of 50 entries. The button is inhibited when the pick list has reached its maximum.
- Tap the Done button to close the window and set the selected airport ID.

If a selected airport is not found in the navigation database, an “Airport not found” message is shown in the display area.

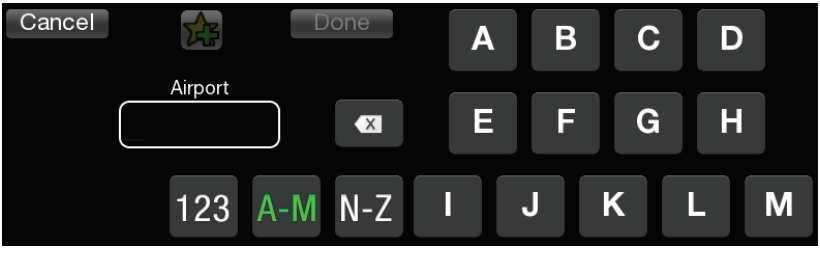


Figure 2-24: Example of Edit Airport ID Window

Favorites Button

This button is labeled with a amber star icon. Tap the button to open the Favorites Pick List window.

Favorites Pick List Window

This window is used to select a pre-saved Airport ID. See Figure 2-25.

- The Favorite Airports list is centered in the display area showing the list of airports set by the user via the add to favorite button located in Edit Airport ID window. The list has a maximum 50 entries organized alphabetically. Use a slide action to scroll the list. Tap an ID from the list to select it.
- Tap the Done button to return to close the window and set the selected airport ID.
- Tap the Delete button to remove the selected airport ID from the favorites list.
- Tap the Cancel button to close the window without changing the current Airport ID.

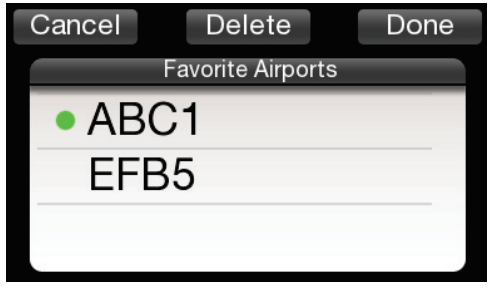


Figure 2-25: Example of Favorites Window

Product Button

This button is labeled with the current selected product. Tap the button to open the Product Pick List window.

Product Pick List Window

This window is used to select an available FIS-B Textual Product, which are METAR, NOTAM , and TAF. See Figure 2-26.

- The Product List is centered in the display area showing the list of available Products. Tap the product from the list to select it.
- Tap the Done button to return to close the window and set the Product.

If selected product text data report is not available, the display area indicates this by displaying the selected product with a “not available” message.

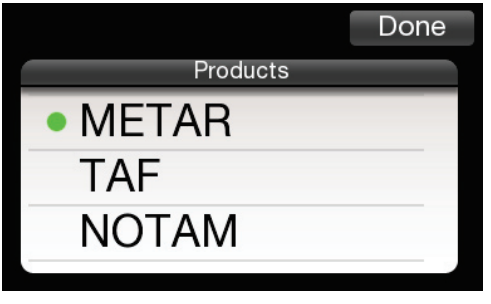


Figure 2-26: Example of Product Pick List Window

MAINTENANCE MODE

Maintenance mode is used to perform a screen calibration. See figure 2-27.

1. Apply power to the Lynx NGT-9000.
2. When the splash screen is shown press and hold (continue holding when the status and version screens are showing) in the lower left corner of the display until the Activate Maintenance Mode window is shown on the right screen.
3. Tap the Yes button to restart the unit in Maintenance Mode. Note - Pressing the No screen button or 10 seconds of inactivity starts normal operation mode.
4. Tap the Screen Calibration text.

5. In the Calibration screen touch and release each target shown. (Four calibration targets and two verification targets). Each must be completed within 15 seconds or the Calibration Time out message is shown. The unit returns to the main screen.
6. If normal operation is desired cycle power to the unit or tap the Reboot text on the main screen followed by tapping the Main App > text to perform a warm startup.
7. When in normal operation check that the touch screen accuracy has improved. If the accuracy has not improved, try the calibration procedure again. If the issue continues contact L-3 Avionics Systems Field Service for help in resolving the issue prior to removing the unit for repair.

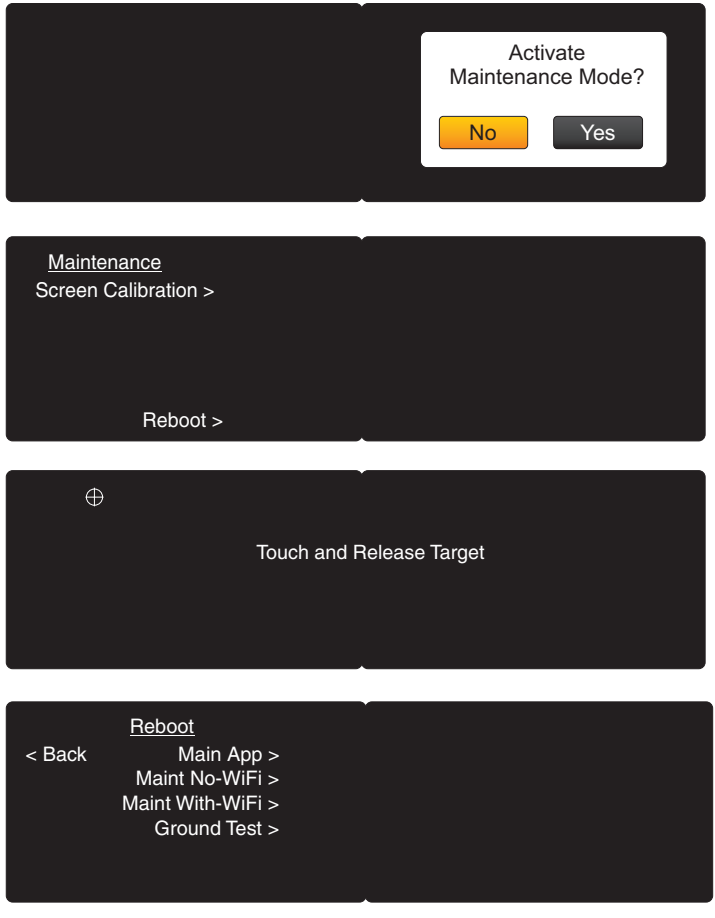


Figure 2-27: Maintenance Screens

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CHAPTER 3
CONTROLS AND INDICATORS

INTRODUCTION

This chapter describes the controls, indicators, and other devices that could be interfaced to the panel and remote mounted Lynx NGT-9000.

COCKPIT SWITCHES

Cockpit switches are optional and may not be a part of the aircraft installation.

IDENT

This switch activates SPI and transmits an ident pulse. An ident pulse highlights the aircraft's symbol on the ATC's radar screen and is identified on the Lynx NGT-9000 screen when active.

INDICATOR LAMPS

Indicator lamps are optional and may not be a part of the aircraft installation.

TAS Alert

The TAS Alert lamp (amber) will illuminate when:

- TAS is enabled and there is a Traffic Alert condition (only possible when TAS is activated).
- TAS is enabled and Self-test is run, the lamp will be "ON" for approximately 8-10 seconds.

ADS-B Out Fail

The ADS-B Out Fail lamp primarily indicates when the Lynx NGT-9000 is not providing ADS-B output data. The lamp may be illuminated (ON) for any of the following reasons:

1. When Lynx NGT-9000 is not powered, lamp defaults to "ON".
2. When the aircraft is On-Ground and the self-test is run, the lamp is "ON" for approximately. 8-10 seconds.
3. Aircraft On-Ground startup the lamp is "ON" initially until the Lynx NGT-9000 has started and is operational after which the lamp will extinguish.

4. When the GPS has “failed”, the lamp is “ON”. GPS failures happen when:
   a. The Lynx NGT-9000 internal GPS indicates a failure.
   b. Aircraft is On-Ground and the GPS has acquired position, but the signal is lost for more than 2 minutes.
   c. Aircraft is In-Air and the GPS has not acquired position within 2 minutes (either startup or had position and lost it).
5. The lamp begins to flash for the following reasons:
   a. Aircraft On-Ground, there is a 2 minute “quiet period” when the GPS is expected to acquire position. After 2 minutes, the lamp will flash indefinitely while the GPS has never acquired, but is not failed.
   b. Aircraft In-Air, at startup or if GPS had position and then lost it, then the lamp will flash for 2 minutes while trying to acquire position, then become failed (see 4c above).

ALTERNATE DISPLAY

An alternate display may be interfaced to the Lynx NGT-9000, but care must be taken to insure that there is not a conflict of input commands. Use the following guidelines when using an alternate display:

- Refer to the operations manual for the alternate display for instructions.
- Check with your dealer or with L-3 Avionics Systems for a current list of compatible alternate displays.
- Lynx NGT-9000 can provide Traffic (ADS-B and TAS) via ARINC 429 and Traffic/FIS-B Weather via RS-422.
- Some alternate displays have the same display ranges as the Lynx NGT-9000, while others generate their own display ranges.
- The look of traffic screens on alternate display may vary. Details on alternate display symbology is shown below. Displays using conventional ARINC 735 TIF traffic will only depict TA, Proximate and other traffic. Displays using the new ARINC 735B DTIF traffic can depict all the listed traffic symbols noted below.

Other Traffic Symbol

On alternate displays the Other Traffic (OT) symbol represents an intruder aircraft that has been detected within the selected display range and vertical display mode, but which has not generated a TA or a PA. The symbol is white or cyan on color alternate displays.

On some alternate displays, OT symbols disappear when a TA occurs, and reappear (if still in range) once the TA goes away. Some alternate displays can also have options set to filter out all OT symbols.

Proximity Advisory Symbol

The Proximity Advisory (PA) represents an intruder aircraft that has not generated a TA, but which is within a horizontal range of 4 nmi and a relative altitude of ±1200 ft. The symbol is white or cyan on color alternate displays.

Off-Scale Traffic Advisory (TA)

This function is limited to Lynx NGT-9000 with TAS enabled. The Off-Scale Traffic Advisory symbol (amber on color alternate displays) represents a TA that has been detected beyond the current display range. The symbol is displayed at a position along the outer range ring that indicates the relative bearing of the intruder aircraft. On an alternate display, a text message such as “OS” or “OFFSCALE” may be used to indicate the presence of an off-scale TA.

Ownship Symbol

This symbol (cyan or white on color alternate displays) represents your aircraft’s relative position and heading.

Indicators

The following data is output from the Lynx NGT-9000 and may be shown on the alternate display:

- GPS Position
- Maintenance Required
- Ident message
- Message Counts
- Seconds Since 0000 UTC

WiFi Interface

The Lynx NGT-9000 provides the following report messages to the Personal Electronic Device (PED) via RS-232:

- Ownship Report
- Traffic Report
- Weather Report

The PED requires applications that support the data. Examples of supported Applications are Sky Radar and Wing X. Check with the L-3 AS web site for latest updates.

AURAL ANNOUNCEMENTS

“Traffic, Traffic” This normal aural component of a traffic advisory is announced once over the cockpit speakers or headset when a TA is first detected. This aural announcement will not be heard if audio is inhibited. It may also be delayed if a higher priority alert is occurring at the time of the alert.

Do not rely solely on the aural alerts for intruder aircraft information. Use the display to view the latest TA and aircraft information. Aural announcements are only made when the TA first occurs and may be inhibited. Traffic Advisory’s are only provided by a NGT-9000+ system as it is produced by the TAS function.

Extended Audio Callouts

The Extended Audio Callouts is a configuration option that adds relative bearing, relative altitude (when available) and range to the intruder information announced as well as the normal alert.

- The relative bearing provides a clock bearing (e.g. “12 O’clock).
- The relative altitude (if available) announces either “High” if > to 50 ft or “Low” if < to -50 ft or “Same Altitude” if > -50 ft or < 50 ft of own altitude).
- The range in nautical miles (slant range if TA is not Non Attitude Reporting (NAR) or Flat range if TA is NAR).

Some examples of extended audio alerts are:

- **“Traffic, Traffic, 10 O’clock high, 5 miles”** This aural announcement is for an intruder at a relative bearing of 300 degrees, at a higher altitude, 5 miles away.
- **“Traffic, Traffic, 6 O’clock same altitude, less than a mile”** This aural announcement is for an intruder at a relative bearing of 180 degrees, at the same altitude, less than a mile away.

AUDIO INHIBIT

This is an optional feature used by a CAWS Alerting System to mute the Traffic Advisory system due to a higher priority audio annunciation.

CP-2500 CONTROL PANEL

The CP-2500 is the authorized Control Panel for the remote mount version of the Lynx NGT-9000R. The operational information provided in this section is limited. Refer to the CP-2500 Pilot's Guide (0040-17250-01) for specific details.

Note

The Flight ID function is optional and is available on the CP-2500 if the Flight ID is configured via the DCM settings during installation of the Lynx NGT-9000.

1. Press the small knob button to apply power to the control panel. To remove power to the CP-2500, press and hold the small knob button until the message "Power Down" is shown on the display. (Note - This does not remove power to the Lynx NGT-9000R.)
2. After power is applied, if the self test passes, the CP-2500 briefly displays "OK". That is followed by the scrolling of the firmware and hardware levels of the CP-2500 (approximately 15 seconds). The CP-2500 then reverts to normal operation.
3. The display of the CP-2500 shows the operational mode on the left side of the display and the squawk code on the right side of the display as shown in Figure 3-1.

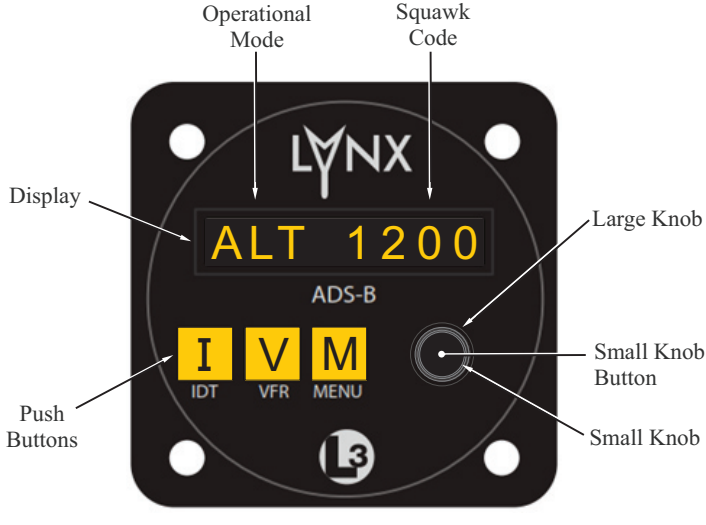

Figure 3-1: Example of CP-2500

4. In normal operation the user can change the operational mode, set the squawk code, view the current pressure altitude, and optionally set a flight ID mode. (The flight ID function is optional and is part of the configuration options set during installation of the Lynx NGT-9000R.) Select these items by rotating the large knob.

   The operational mode is changed by rotating the small knob and can be set to Altitude, On, or Standby. The Altitude (ALT) mode should always be selected unless Air Traffic Control (ATC) requests a change or if there is a known problem with the control panel or Lynx NGT-9000R.

   Note – If the CP-2500 operational mode is set to Standby the ADS-B Out Fail lamp is ON and the ADS-B System Fail message is displayed on the CP-2500 screen.

   - Change the squawk code by rotating the large knob to select the squawk page and then press the small knob. Observe that the left most digit blinks. Rotate the small knob to change the number, rotate the large knob to select the next digit. Repeat until all digits are changed. Press the small knob or allow the screen to time out to commit the change. Note: When changing the squawk code the transponder squawk code must also be changed. The recommended way of changing the squawk code is to first change the Transponder and then confirm on the CP-2500 per the “PUSH TO ACCEPT” explanation found in step 6 below.
   - View the pressure altitude by rotating the large knob until the “Altitude” is shown. Press the small knob view. Press the small knob again to return to normal operation.
   - If configured rotate the large knob to select ID. Press the small knob to select the first digit. Rotate the small knob to change the digit (CCW) or character (CW). Rotate the large knob to move the cursor to the next digit. Press the small knob to commit. Deactivate the Flight ID by rotating the large knob CW to move the cursor off the right side of the display. Continue rotating unit only dashes fill the display. Press the small knob to commit.

5. The CP-2500 has three buttons identified as I (Ident), V (VFR), and M (Menu).
   - Pressing the I (IDT) button activates the IDENT message to be sent by the ADS-B unit for 18 sec. IDENT is displayed while this message is being sent. The use of this button is directed by Air Traffic Control (ATC). When instructed by ATC, the IDENT (IDT) must be selected ON for both the transponder and the Lynx NGT-9000R. This can be accomplished by pushing the IDENT button on each unit or with a remote IDENT push button which is connected to both the Lynx NGT-9000R and the mode A/C transponder.
   - Pressing the V (VFR) button sets the squawk code to a programmed VFR code that is set in the menu (see VFR code below). Typically it is set to 1200 (in the United States). Pressing the button again returns the code to the previous squawk code.
   - Pressing the M (Menu) button provides access to the following functions (Info, VFR Code, and Maintenance). Rotate the large knob to scroll the menu options across the display. Press the small knob button to select a menu option. Press the M button to exit to normal operation.

     Selecting info shows Status ,Hardware and Software revision of the CP-2500.

     The VFR code can be changed from the default (always set to 1200 in the United States).

     The Maintenance menu is available only when the aircraft is on ground. Press the small knob to enter “Self TST”. Press the small knob again to see current status and rotate the small knob to change status to enabled. Press small knob or allow the screen to time out to set. When activated, the screen momentarily displays “TEST STARTED”. If the ADS-B Out Fail lamp is installed it illuminates for 10 seconds during the test.

     Press the small knob to exit the menu and return to normal operation. Note: When “Done” is showing on the screen it does not time out and the knob must be pressed to exit.

6. Messages being received from the Lynx NGT-9000R have priority over normal display operation and are seen scrolling across the display. Entering the menu mode will stop the messaging until the menu mode is exited. Rotating the large knob scrolls through the prioritized messages and the normal display operation (showing operational mode and squawk code). The display begins showing the highest priority message again after 10 seconds of no activity. The priority of the messages is discussed in the CP-2500 product manuals.
   The following messages may be seen during normal operation.
   - ADS-B SYSTEM FAIL: The ADS-B out is not being transmitted by the Lynx NGT-9000R due to the CP-2500 being in Standby Mode, the GPS position not being available for more then 2 minutes, or possibly a failure of the Lynx NGT-9000R.
   - GPS FAIL: The GPS derived position input is not functioning.
   - IDENT: The IDENT message is being sent by the Lynx NGT-9000R via ADS-B Out.
   - GPS INIT: GPS Initialization –The GPS contained within the Lynx NGT-9000R is not ready.
   - NO ADS-B COVERAGE: No ground based transceiver has acknowledged the presence of the Lynx NGT-9000R in the system. No TIS-B, ADS-R, or FIS-B information is available. (This message is suppressed if TAS is equipped and enabled.)
   - XPDR FAIL: The transponder function of the Lynx NGT-9000R has failed.

CHAPTER 4
PRINCIPLES OF TAS OPERATION

INTRODUCTION

This chapter describes Traffic Advisory (TA) criteria and other factors that affect the display of traffic symbols for models of the Lynx NGT-9000 with a Active Traffic Awareness System (TAS). Table 4-1 summarizes the criteria necessary to display a traffic advisory. Figure 4-1 shows the TAS Traffic Zone Graphic.

SENSITIVITY LEVELS

The A or B sensitivity level is used to determine when to display a TA. Having two sensitivity levels allows the unit to reduce the number of nuisance TAs during takeoff and landing (sensitivity level A), and to maximize the detection of TAs during the cruise phase of flight (sensitivity level B).

Sensitivity Level A

Sensitivity level A consists of two criteria for displaying a TA:

1. The intruder aircraft enters into an area of airspace surrounding ownship defined by a 0.2 nmi horizontal radius and a height of ±600 ft from ownship
2. The intruder aircraft approaches ownship on a course that will intercept ownship within 15 or 20 seconds (within 15 seconds for a non-altitude reporting intruder aircraft; within 20 seconds for an altitude reporting intruder aircraft).

The unit uses sensitivity level A in the following situations (corresponds to numbers 1, 2, 7, and 8 in Table 4-1):

1. Ownship has a valid AGL (above ground level) altitude and is below 2,000 ft AGL. Note - The unit calculates height above terrain using GPS Altitude and nearest airport elevation.
2. Ownship AGL Altitude is Invalid , and ownship ground speed is available and is less than 120 knots.

Sensitivity Level B

Sensitivity level B consists of two criteria for displaying a TA:

1. The intruder aircraft enters into an area of airspace surrounding ownship defined by a 0.55 nmi horizontal radius and a height of ±800 ft from ownship.
2. The intruder aircraft approaches ownship on a course that intercepts ownship within 20 or 30 seconds (within 20 seconds for a non-altitude reporting intruder aircraft; within 30 seconds for an altitude reporting intruder aircraft).

The unit uses sensitivity level B when the criteria for Sensitivity Level A has not been met. (Corresponds to numbers 3, 4, 5 and 6 in Table 4-1).

Table 4-1: Traffic Advisory Situations

NO.	OWN SHIP ALT	OWN SHIP GND SPEED	OTHER AIRCRAFT IS DETECTED
1	Below 2000 ft AGL		Within a 0.2 nmi horizontal radius and a +/- 600 ft relative altitude.
2			Within 15-20 sec of CPA *
3	Above 2000 ft AGL		Within a 0.55 nmi horizontal radius and a +/- 800 ft relative altitude.
4			Within 20-30 sec of CPA *
5	Has invalid AGL Altitude	Available and ≥ to 120 knots	Within a 0.55 nmi horizontal radius and a +/- 800 ft relative altitude.
6			Within 20-30 sec of CPA *
7		Available and < 120 knots	Within a 0.2 nmi horizontal radius and a +/- 600 ft relative altitude.
8			Within 15-20 sec of CPA *

Sensitivity Level A	Sensitivity Level B

* CPA means Closest Point of Approach

** Ground speed is not available whenever your GPS navigation information is not available.

TA SYMBOL DURATION

A TA symbol remains on the screen for at least 8 seconds, even if the intruder aircraft no longer meets the TA criteria, as long as the Lynx NGT-9000 continues to track the aircraft.

OTHER AIRCRAFT GROUND FILTERING

If your aircraft is at or below 1700 ft AGL, the traffic awareness system (TAS) will not display or calculate alerts for other aircraft which are determined to be on ground (not airborne). Intruders determined to be below 380 ft AGL are considered to be on ground and will not be output with the TAS active traffic output.

NOTE

Since the Lynx NGT-9000 also receives ADS-B traffic information, aircraft no longer under TAS surveillance may still be displayed based on the received ADS-B traffic data.

INTERFERENCE LIMITING

To assure that interference effects from active TAS equipment are kept to a minimum, the FAA requires TAS equipment to “interference limit,” i.e. reduce its transmit power, when it is operating in congested airspace. This limiting function is based on the number of TCAS II interrogators detected via Mode S broadcast reception and the reply rate of your transponder. Interference limiting reduces the effective surveillance range of the TAS equipment and is independent of the display range selected; therefore, selecting a display range of 20 nmi does not guarantee a 20 nmi TAS surveillance range when operating in high density areas.

NOTE

This interference limiting function is for active TAS and does not affect the range at which ADS-B reporting traffic will be received. It also does not limit the range at which the Lynx NGT-9000 ADS-B output will be received by other aircraft.

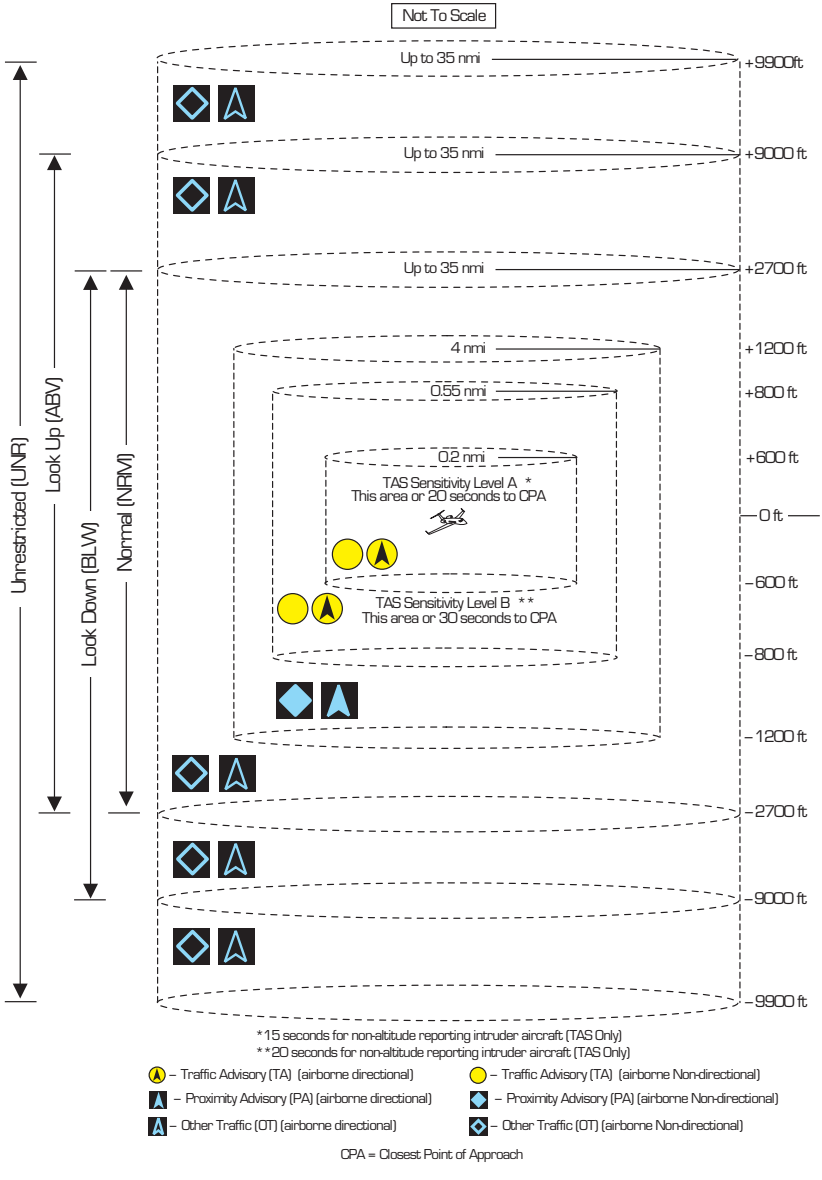

Figure 4-1: Traffic Display Mode and TAS Traffic Zone Graphic

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CHAPTER 5
TROUBLESHOOTING

INTRODUCTION

This chapter describes potential conditions that could occur while using the Lynx NGT-9000 MultiLink Surveillance System.

Installations using a display for traffic or weather should also refer to that products Pilot's Guide for troubleshooting information.

It is recommended to crosscheck other cockpit displays/instruments for errors and/or data inconsistency. Operation of indicator lamps is provided in Chapter 3.

If problems persist, contact an Avionics Systems authorized service center or L-3 Avionics Systems Field Service at (800) 453-0288 noting symptoms, error messages, and flight conditions.

GENERAL DISPLAY CONDITIONS

The indications listed in the table below are shown on the display during normal operation. This information is also included in the operation section and is included here for convenience.

Table 5-1: General Display Conditions

for the Panel Mount Lynx NGT-9000

INDICATION	DESCRIPTION
Pressure Altitude digits replaced with amber dashes.	Invalid Pressure Altitude
ON-GND	Transponder is operating in the on-ground mode.
Traffic Failed (Amber text)	Displayed if both ADS-B and TAS (optional) have failed.
XPDR Failed (Amber text)	Transponder data is invalid. This indication is shown on the transponder screen and alternate traffic screen.

Table 5-1: General Display Conditions

for the Panel Mount Lynx NGT-9000

INDICATION	DESCRIPTION
Traffic Unavailable (Amber text)	• ADS-B is operational but heading and track are invalid. • GPS is failed. • TAS is in Standby. • Transponder Mode Control is “ON” which inhibits the display of relative altitude so traffic is unavailable.
TAS STBY (Models with TAS only)	A traffic mode indicator that is shown when the Traffic Awareness (TAS) system is in standby.
TAS ONLY (Models with TAS only)	A traffic mode indicator that is shown when TAS is in operation, but ADS-B is unavailable.
ADS-B ONLY (Models with TAS only)	A traffic mode indicator that is shown when TAS is failed (or not available) and ADS-B is available.
Initializing	The indication is shown on the weather map (FIS-B application screen). It continues to be shown until internal operations have completed.
Map Fail	The indication is shown on the weather map (FIS-B application screen). It is shown when a fault is detected that prevents the FIS-B data from showing on the screen.
TRK (Track)	Indicates that the traffic display orientation is true track.

SYSTEM STATUS MESSAGES

This section applies to the panel mount Lynx NGT-9000. The system status messages are seen on the screen either during start up or when the System Test button is pressed. The typical meanings of the messages are detailed in the bullets below.

- A “Fail” message is caused by something internal to the Lynx NGT-9000.
- An “External Fail” message is caused by a problem with the external equipment input signals. The unit continues to attempt to acquire the signal without rebooting. These messages will automatically clear once communications has been restored to the external equipment.
- A “Degraded” message indicates a function has limited capability due to an internal failure.
- An “External Degraded” message indicates a function has limited capability due to an external failure.
- A “Coverage” or “No Signal” message indicates that no signal is being received from a ground station.

Attempt to clear fail or degraded messages by cycling power to the unit.
The Continue button is active whenever a failure or degraded window message is shown. It may be used to begin normal operation with degraded performance.

The Lynx NGT-9000 continues to operate even if a failure is detected during the System Test by providing any functionality unaffected by the failures. Secondary faults are displayed as “Service Unit Soon” as part of the message. (These faults do not directly impact the operation and function of the Lynx NGT-9000, but are recorded in the maintenance log).

Tap the MSG button located on the Transponder Application screen to view fail messages during normal operation. The MSG button blinks when new messages have been received and have not yet been viewed. When all the faults are cleared the MSG button is removed from the screen.

INVALIDITIES

Refer to Table 5-2 (panel mount) or Table 5-3 (remote mount) for answers to invalidities and other conditions noted on the Lynx NGT-9000 system. An invalidity may not stop operation of the unit, but may degrade performance. Invalidities may self correct depending on the issue. Other conditions may indicate that the unit is working correctly. Some symptoms such as a compatible display or indicator lamp are available only if installed on the aircraft.

If the System Status Button is displayed, press it and review the messages.

Table 5-2: Troubleshooting for the Panel Mount Lynx NGT-9000

SYMPTOM	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 tolerance. 1. A Screen Calibration may need to be performed. See Maintenance Mode. 2. If problem continues contact L-3 Field Service before removal.

Table 5-2: Troubleshooting for the Panel Mount Lynx NGT-9000

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
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 indicate a functional failure.	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 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.
• 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 Lynx NGT-9000. • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.

Table 5-2: Troubleshooting for the Panel Mount Lynx NGT-9000

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
• 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 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.
• 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.

Table 5-2: Troubleshooting for the Panel Mount Lynx NGT-9000

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
• 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 targets are not transmitting ADS-B data, or the ground station is not transmitting 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.
• 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 transmitted 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.

Table 5-2: Troubleshooting for the Panel Mount Lynx NGT-9000

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
The traffic symbols on the traffic display are non-directional (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. 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 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 degraded. • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment..

Table 5-3: Troubleshooting for the Remote Mount Lynx NGT-9000R

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
• CP-2500 displays “ADS-B SYSTEM FAIL” and “XPDR FAIL”. • If installed, ADS-B Out Fail lamp does not flash after power ON and remains illuminated. • No traffic or weather information on the compatible displays.	The Lynx NGT-9000 is not operating: 1. Verify NGT-9000 breaker is closed. 2. If breaker is open, reset the circuit breaker.
• The CP-2500 altitude page displays “INVLD PA”. • If installed, the ADS-B Out Fail lamp is OFF.	Either the NGT-9000 is not receiving BARO-ALT (Pressure altitude), or the control panel is set to ON mode. 1. If installed verify that the CP-2500 is set to ALT Mode. 2. If BARO-ALT is not being received there may be a problem with the equipment.
• CP-2500 displays “XPDR FAIL” and “ADS-B SYSTEM FAIL”. • If installed, ADS-B Fail lamp is ON.	The transponder function of the Lynx NGT-9000 has failed. • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
The CP-2500 menu Initiated Self Test Fail.	The interface to the Lynx NGT-9000 has failed. 1. Cycle power to the NGT-9000. 2. If problem continues contact service center or L-3 Field Service for corrective action.
• CP-2500 displays “ADS-B SYSTEM FAIL” and “XPDR FAIL”. • 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 Lynx NGT-9000R. • At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.

Table 5-3: Troubleshooting for the Remote Mount Lynx NGT-9000R

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
• CP-2500 displays no message for first 2 minutes, then 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-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-9000R. 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.
• 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.
• 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 (On Ground or In Air– previous position fix). 1. The GPS signal may be weak. If on ground 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.

Table 5-3: Troubleshooting for the Remote Mount Lynx NGT-9000R

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
• CP-2500 displays “NO ADS-B COVERAGE”. • No data on the compatible weather display. • If installed, ADS-B Fail lamp is OFF. Note - The lamp does not illuminate and the CP-2500 message is not shown if TAS is active, if so equipped.	The FIS-B data is not being transmitted to the compatible 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 compatible traffic display are non-directional (diamond shape)	Non-directional traffic symbols on the traffic display is due to the following reasons: • The alternate traffic display does not support the DTIF data format necessary to show directional data provided by ADS-B.
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 5-3: Troubleshooting for the Remote Mount Lynx NGT-9000R

SYMPTOM	CAUSE/CORRECTIVE ACTIONS
• CP-2500 displays “NO ADS-B COVERAGE”. • No targets are shown on the compatible traffic display. • If installed, ADS-B Fail lamp is OFF.	The aircraft is not in an ADS-B (1090ES or 978 UAT) coverage area, and the targets are not transmitting ADS-B data, or the ground station is not transmitting TIS-B data. 1. The symptoms appear if the ground station is not transmitting TIS-B and there are no 1090ES or 978 UAT targets within range. 2. This message is removed when the aircraft is within coverage area range of a ground station. 3. The target or ground station needs to be within line-of-site range. 4. At next power cycle if symptoms persist contact L-3 Field Service before removal of the unit or other equipment.
Traffic display is working correctly, but aircraft are not showing up on the display.	Lack of data as described below: • The ADS-B In requires other aircraft to be equipped with ADS-B Out. • The TIS-B and ADS-R services are supported when in range of ground stations providing the service. • 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.

APPENDIX A
RECORD OF IMPORTANT INFORMATION

Dealer Information

Name _____

Address _____

City, State, Zip _____

Telephone _____

Equipment Information

Date of Purchase _____

Installation Date _____

Model Number _____

Part Number _____

Serial Number _____

Mod Letter _____

Software Release _____

Aircraft Information

Aircraft Make _____

Aircraft Model _____

Serial Number _____

N Number _____

Register this product online at:
www.l-3avionics.com/warrantyregistration

Aviation Products

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