

\$12.00 U.S.

**Pilot's Guide  
for the**

**SKYWATCH<sup>®</sup>**

**Traffic Advisory System**

**Model SKY497**



communications

# Eyes That Never Blink™

## Early Traffic Alert/Advisory Systems

In the early days of flight, pilots were equipped with all they needed for effective collision avoidance—a sharp pair of eyes. But increasing traffic at higher speeds led to the development of TCAS I and II (Traffic Alert and Collision Avoidance Systems) which were too expensive for most regional airlines, business aircraft, and general aviation aircraft.

## SKYWATCH®

L-3 Avionics Systems recognized the need for an alternative to expensive TCAS systems and developed the SKYWATCH model SKY497 Traffic Advisory System (TAS).

The SKY497 provides most of the capabilities of TCAS I, but at a significantly lower cost making it practical for small aircraft. In addition, the SKY497 can share the display that comes with the *Stormscope*® model WX-1000 so there's no need to buy another display if you already own a WX-1000 display (part number 78-8060-5900-8). The SKY497 can also display its traffic information on a growing number of multi-function displays from companies such as Avidyne, UPSAT, L-3 (i-linc™ MFD), Garmin, and Collins. You can even display SKYWATCH traffic information on a compatible weather radar indicator via the L-3 Avionics Systems Radar Graphics Computer.

## Proven Experience

L-3 Avionics Systems has been involved in the development of collision warning programs since the early 1980's. In 1985, L-3 Avionics Systems began development of an enhanced collision warning system for the Navy's T-34C training aircraft.

Based largely on the success of the Navy project, L-3 Avionics Systems was selected to validate the specifications for TCAS I. As a result, L-3 Avionics Systems' original TCAS I unit, the TCAS791 was the first TCAS I to be granted a Technical Standard Order (TSO), first to receive a full, unrestricted Supplemental Type Certificate (STC), first to fly, and first to be delivered.

Pilot's Guide  
for the  
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Traffic Advisory System  
Model SKY497



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Designed and manufactured in the United States of America by



L-3 Communications Avionics Systems, Inc.  
5353 52nd Street, S.E.  
Grand Rapids, MI 49512 USA  
(800)253-9525 or (616)949-6600  
Fax (616)285-4224  
[www.L-3com.com/as](http://www.L-3com.com/as)

# Safety Summary

These warnings and cautions appear later in this guide and are repeated here for emphasis:

**CAUTION** *To avoid power surges that could damage the SKY497 and the optional WX-1000, start your engines before turning on the SKY497.*  
page 3-1

**WARNING** *If the SKY497 is in SKYWATCH mode, the display will not automatically switch into Stormscope mode to display thunderstorms or Stormscope errors. Use the remote SKYWATCH/Stormscope mode switch to periodically check for thunderstorms or Stormscope errors.*  
page 3-5

**WARNING** *The SKY497 relies on information obtained from transponders in nearby aircraft. The SKY497 does not detect or track aircraft which are not equipped with an operating Air Traffic Control Radar Beacon System (ATCRBS) transponder.*  
page 3-6

**WARNING** *The SKY497 does not track intruder aircraft approaching at a closure rate greater than 900 knots.*  
page 3-6

**WARNING** *Some traffic within the chosen display range may not be displayed due to traffic prioritizing, antenna shielding, ground intruder filtering, or surveillance range being shorter than the chosen display range.*  
page 3-6

**CAUTION** *Optimum SKY497 performance is realized when intruder aircraft are reporting their altitude (via a mode C or other altitude reporting transponder).*  
page 3-6

**WARNING** *Do not attempt evasive maneuvers based solely on traffic information on the display. Information on the display is provided to the flight crew as an aid in visually acquiring traffic; it is not a replacement for Air Traffic Control (ATC) and See & Avoid techniques.*  
page 3-7

# Important Notice

This guide provides general information about the operation of the SKY497. This guide does not cover all possible interconnections with all possible types and numbers of alternate displays and customer-supplied switches. Refer to your aircraft flight manual and flight manual supplement for information specific to your aircraft. If there is conflicting information between those manuals and this pilot's guide, your aircraft flight manual and flight manual supplement take precedence over this pilot's guide.

# Revision Highlights

This revision D of the pilot's guide makes the following changes:

- Changes occurrences of “Goodrich Avionics Systems” to “L-3 Communications Avionics Systems, Inc.” or just “L-3 Avionics Systems” and makes related company contact information changes. (On March 28, 2003, Goodrich Corporation sold its Avionics Systems division to L-3 Communications Corporation.)



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# Abbreviations & Acronyms

ABV	Above
Ack	Acknowledge
AFS	Flight Standards Service
AGL	Above Ground Level
ARINC	Aeronautical Radio, Inc.
ATC	Air Traffic Control
ATCRBS	Air Traffic Control Radar Beacon System
ATI	Air Transport Indicator
BRT	Brightness
BITE	Built-In Test Equipment
BLW	Below
CPA	Closest Point of Approach
CRT	Cathode Ray Tube
EFIS	Electronic Flight Instrument System
EGPWS	Enhanced Ground Proximity Warning System
FAA	Federal Aviation Administration
fpm	Feet Per Minute
FSAW	Flight Standards Information Bulletin for Airworthiness
GPWS	Ground Proximity Warning System
IVSI	Instantaneous Vertical Speed Indicator
MFD	Multi-Function Display
Mod	Modification
nm	Nautical Miles (on the display)
nmi	Nautical Miles (in the text)
NRM	Normal
OPR	Operate
OT	Other Traffic
PA	Proximity Advisory
Rev	Revision
RGC	Radar Graphics Computer
RMS	Root Mean Square
RTCA	Requirements & Technical Concepts for Aviation
SLA	Sensitivity Level A

## Abbreviations & Acronyms (continued)

SLB	Sensitivity Level B
STB	Standby
STC	Supplemental Type Certificate
TA	Traffic Advisory
TAS	Traffic Advisory System
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Alert and Collision Avoidance System
TRC	Transmitter Receiver Computer
TSO	Technical Standard Order

# Chapter 1

## ***System Description***

### **General Description**

The SKYWATCH® Traffic Advisory System (TAS), model SKY497, from L-3 Avionics Systems monitors the airspace around your aircraft and advises the flight crew where to look for transponder-equipped aircraft that may pose a collision threat. The SKY497 displays traffic information on one or more displays. The traffic information generally includes the range, relative bearing, and relative altitude of intruder aircraft. The SKY497 also makes aural announcements such as traffic advisories on the cockpit audio system. The SKY497 is intended for use by corporate and general aviation aircraft including rotorcraft. Figure 1-1 shows the major components of the SKY497.



*Figure 1-1. SKY497 Major Components*

## Transmitter Receiver Computer (TRC)

The TRC is the primary unit of the SKY497. It converts signals from the directional antenna and from other aircraft systems into an on-screen picture of intruder aircraft locations, and if necessary, aural traffic advisories. The TRC can track up to 30 intruder aircraft simultaneously, but to reduce clutter, the SKY497 only displays the 8 most threatening intruders being tracked. The TRC also contains Built-In Test Equipment (BITE) which detects faults and verifies proper operation.

## Directional Antenna

The directional antenna transmits omnidirectional mode C interrogations and receives directional replies from other transponder-equipped aircraft in the vicinity.

## Displays

The SKY497 displays traffic information on a WX-1000/SKY497 display and/or on a growing number of alternate displays. Both display options are described below.

### WX-1000/SKY497 Display

The WX-1000/SKY497 display can be dedicated to the SKY497 or shared with a *Stormscope*® Weather Mapping System model WX-1000 using a remote SKYWATCH/*Stormscope* mode switch. (See figures 1-2 and 1-3.) This display (part number 78-8060-5900-8



Figure 1-2. Display with a Typical SKYWATCH Screen



Figure 1-3. Display with a Typical Stormscope Screen (Optional)

or -9) is a self-contained, 3-inch Air Transport Indicator (3-ATI) sized unit with a high resolution, green monochrome Cathode Ray Tube (CRT) display. The bezel contains four momentary contact push-button switches and an on/off/brightness knob. The display provides control and display functions for the SKY497 and for a WX-1000 *Stormscope* (if installed).

The display does not display traffic and storm information simultaneously. The position of a remote SKYWATCH/*Stormscope* mode switch determines whether the display shows traffic or storm information; however, if you're in *Stormscope* mode and the SKY497 detects traffic that may pose an immediate threat to your aircraft, the display temporarily switches to SKYWATCH mode.

The display ranges for the WX-1000/SKY497 display are 2 & 6 nmi.

## Alternate Displays

Alternate displays include Multi-Function Displays (MFDs) and Electronic Flight Instrument System (EFIS) displays from companies such as Avidyne, Garmin, UPSAT, L-3 (i-linc™ MFD), and Collins; select Instantaneous Vertical Speed Indicators (IVSIs) from Honeywell or Sextant; and a compatible weather radar indicator via the L-3 Radar Graphics Computer. Check with your dealer or with L-3 Avionics Systems for a current list of approved alternate displays.

Figure 1-4 shows a typical SKY497 traffic screen on an alternate display. The look of traffic screens on your particular alternate display may vary.

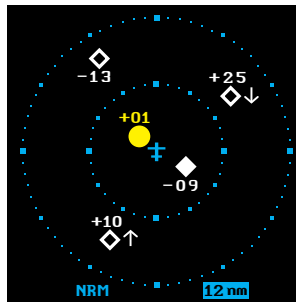


Figure 1-4. Typical Traffic Screen on an Alternate Display

You can use an alternate display in place of, or in addition to the WX-1000/SKY497 display; however, you can't have an alternate display in addition to the WX-1000/SKY497 display if you have a WX-1000 processor connected to the SKY497.

If you're using only an alternate display, you will also have a customer-supplied on/off switch for the SKY497 and discrete buttons for range, vertical display mode, operate/standby, and test if the alternate display can not provide these functions.

Some alternate displays have the same display ranges as the WX-1000/SKY497 display while others generate their own display ranges. The RGC/radar indicator displays SKY497 traffic in 2 and 6 nmi display ranges only.

Hereafter, the word *display* generally refers to the WX-1000/SKY497 display unless otherwise indicated. For any other displays, refer to that display's manual for a description of how it displays SKY497 traffic information.

## Interaction of Major Components

Figure 1-5 shows how the major components of the SKY497 connect to each other and to other aircraft systems.

### *Notes on Figure 1-5:*

1. The optional radio altitude input affects the SKY497 audio inhibit feature, the ground intruder filtering feature, and the sensitivity levels feature. (See chapter 4 for details.)
2. A flight data computer or other ARINC 429 output device may replace individual analog sensors for supplying barometric altitude and/or heading.
3. The SKY497 works *without* a heading input, but experiences degraded performance during high-rate-of-turn maneuvers.
4. Having a weight-on-wheels input allows the SKY497 to automatically switch out of standby when you take off, and into standby when you land.
5. The SKY497 may be installed on aircraft with fixed landing gear. The optional landing gear position input affects the sensitivity levels feature and the SKY497 audio inhibiting feature. (See chapter 4 for details.)
6. The control panel consists of only a power switch if you're using only the RGC/radar indicator. The size, scale, scope, and implementation of the control panel depends on the type and number of displays installed.

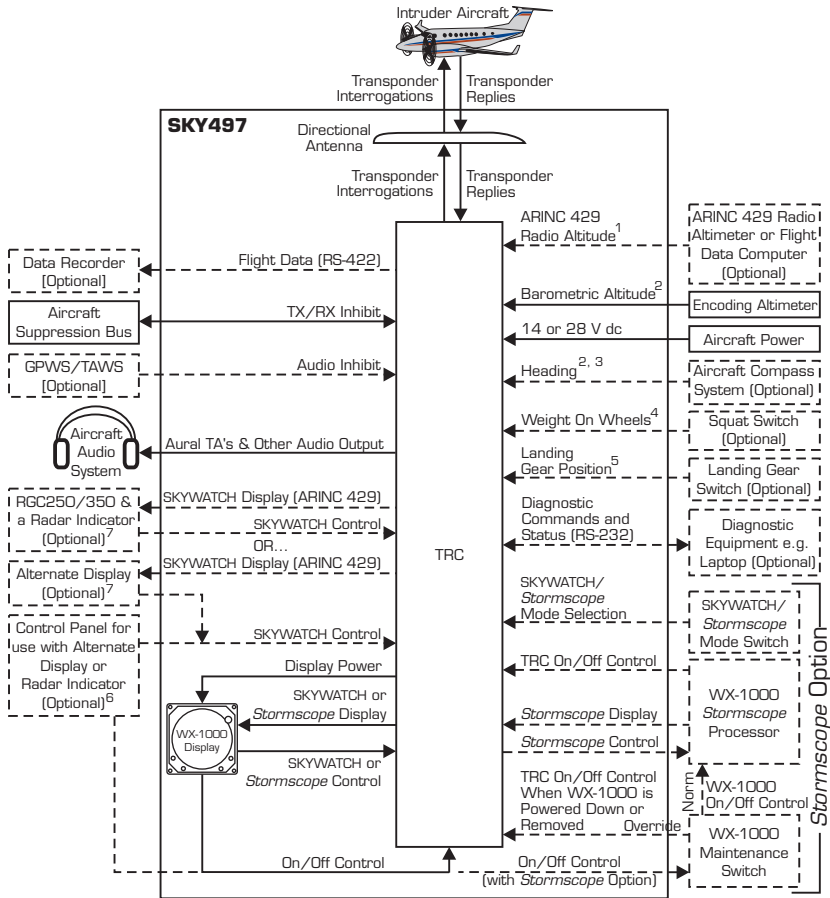


Figure 1-5. System Block Diagram

7. The RGC/radar indicator or an alternate display can be in place of, or in addition to the WX-1000/SKY497 display, but you can't have an RGC/radar indicator or an alternate display connected in addition to the WX-1000/SKY497 display if you have a WX-1000 processor connected to the SKY497.

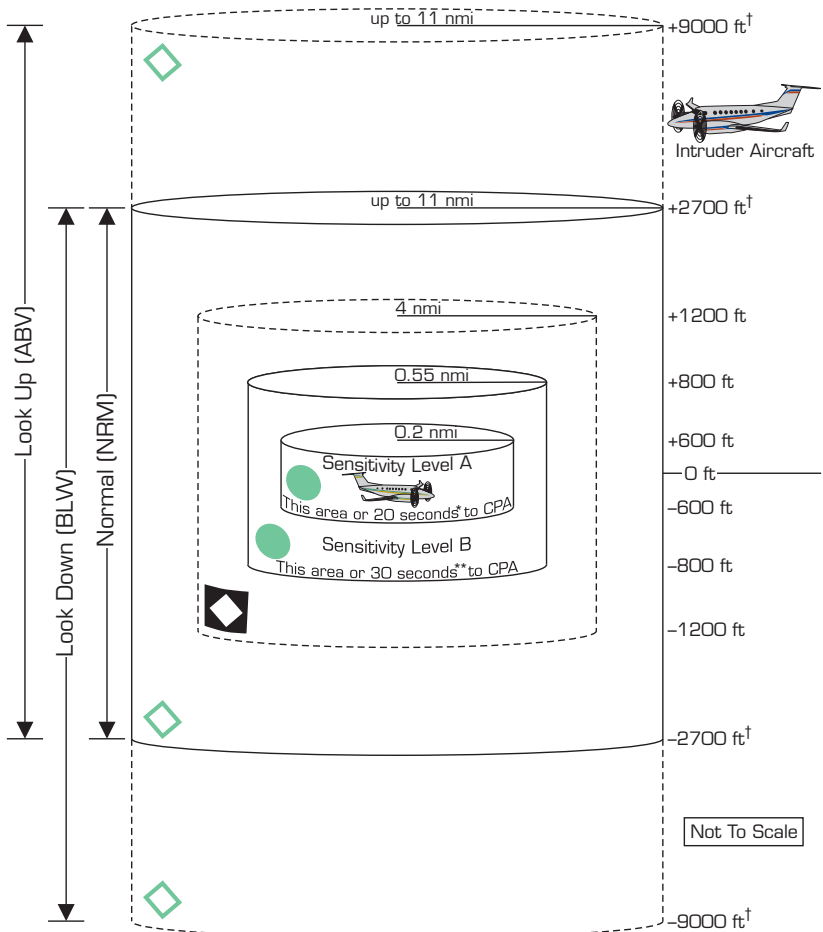
## Functional Description

The SKY497 is an active system that operates as an aircraft-to-aircraft interrogation device. The SKY497 interrogates aircraft transponders in the surrounding airspace (within an 11 nmi horizontal radius) similar to the way that ground-based radar interrogates aircraft transponders. When the SKY497 receives replies to its interrogations, it computes the responding aircraft's range, relative bearing, relative altitude, and closure rate. The SKY497 then predicts collision threats and plots the eight most threatening aircraft locations on the display.

Figure 1-6 shows the SKY497 vertical display modes (look up, look down, and normal). The figure also shows the traffic zones around your aircraft and the traffic symbols that appear on the display when intruding aircraft enter one of those zones.

A solid circle is the visual part of the Traffic Advisory (TA) that the SKY497 generates when it predicts that an intruder aircraft may pose a collision threat. The aural part of the TA, "traffic, traffic," is annunciated over a cockpit speaker or headset. A solid diamond (Proximity Advisory, PA) represents traffic that is close but does not pose an immediate collision threat. (PA's only appear on alternate displays, not including the RGC/radar indicator.) An open diamond represents Other Traffic (OT) that does not pose an immediate collision threat.

The SKY497 uses either Sensitivity Level A (SLA) or Sensitivity Level B (SLB) to determine when to display a TA. In general, SLB is used during the in-flight phase and SLA is used during takeoff and landing. Sensitivity levels and other factors affecting the display of traffic symbols are discussed in detail in chapter 4.



\*15 seconds for non-altitude reporting intruder aircraft  
 \*\*20 seconds for non-altitude reporting intruder aircraft  
 Refer to chapter 4 for details.  
 † These vertical display mode numbers apply to the WX-1000/SKY497 display and the RGC/radar indicator; the numbers may vary for other alternate displays  
 CPA – Closest Point of Approach  
 ● – Traffic Advisory (TA)  
 ◈ – Proximity Advisory (PA – on alternate displays only, not including the RGC/radar indicator)  
 ◇ – Other Traffic (OT)

Figure 1-6. Vertical Display Modes and Traffic Zones

## Features

- Tracks up to 30 intruder aircraft (displays the 8 most threatening)
- Tracks intruder aircraft approaching at closure rates up to 900 knots
- Costs only a fraction of the price of a traditional TCAS I or II
- Does not require a mode S transponder
- Displays traffic information in various horizontal display ranges depending on the type of display and installation configuration.
- Provides for the display of traffic information in three vertical display modes: normal ( $\pm 2,700$  ft), look up (+9,000 ft to  $-2,700$  ft), and look down (+2,700 ft to  $-9,000$  ft) (details on page 6-2)
- Generates visual *and* aural advisories of aircraft that may pose a collision threat
- Performs automatic and operator-initiated self tests
- Offers a high-resolution, green monochrome, CRT display option
- Transmits interrogations from the ground (if desired) as well as from the air
- Shares a display with the *Stormscope* WX-1000 (if desired)
- Switches to the SKYWATCH screen from the optional *Stormscope* screen automatically when a TA occurs
- Uses only one antenna
- Eases installation since the standard display fits in a 3-ATI cutout in the cockpit panel
- Displays traffic on a variety of displays

# Chapter 2

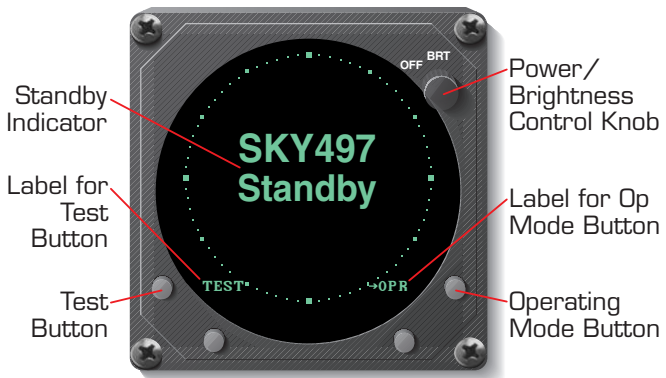
## **Controls & Indicators**

### Introduction

This chapter describes the SKY497 controls and indicators including the controls, indicators, and symbols on the display, discrete controls and indicators, and aural announcements.

### Controls, Indicators, & Symbols

Figures 2-1 and 2-2 and the following paragraphs describe the SKY497 controls, indicators, and symbols.



*Figure 2-1. Controls & Screen Elements in Standby*



#### **Power/Brightness Control Knob (OFF/BRT)**

This knob controls power to the SKY497 and WX-1000 (if installed) and adjusts display brightness.

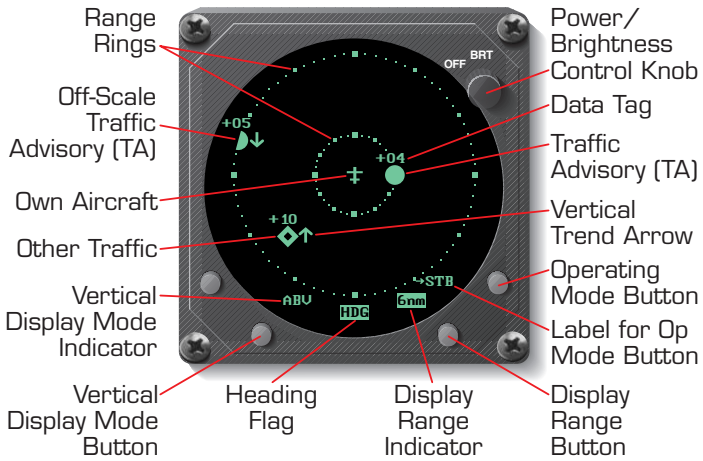


Figure 2-2. Controls & Screen Elements in Operating Mode

**+04 Data Tag** These two digits indicate, in hundreds of feet, the relative altitude of the intruder. In this case, +04 means the intruder aircraft is 400 feet above you. A positive data tag is displayed above the traffic symbol to emphasize that the intruder aircraft is above your aircraft. Similarly, a negative data tag is displayed below the traffic symbol. If the intruder is at the same altitude as your aircraft, 00 is displayed above the traffic symbol.

The data tag for a vertically out of range TA stays at the maximum or minimum relative altitude number of the current vertical display mode until the intruder aircraft comes within the relative altitude limits of the vertical display mode. The SKY497 only displays data tags for altitude reporting aircraft. Non-altitude-reporting aircraft are considered to be at the same altitude as your aircraft.

**Traffic Advisory (TA)** A TA consists of a symbol on-screen and a “traffic, traffic” message on the cockpit speakers or headset. When an intruder aircraft that meets the TA criteria described in chapter 4 is within the displayed range (inside or outside of the selected vertical display mode), the corresponding symbol is this circle located at a position on the screen that indicates the relative bearing and range of the intruder aircraft.

In general, the SKY497 issues a TA when it detects an intruder aircraft within 30 seconds of a possible collision, or within a 0.55 nmi horizontal radius and a  $\pm 800$  ft relative altitude range of your aircraft. (See chapter 4 for details.)

The TA symbol is amber on color alternate displays.



**Vertical Trend Arrow** A vertical trend arrow indicates 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.



**Operating Mode Button** Pressing this button when it's labeled  $\rightarrow$ STB switches the SKY497 out of operating mode and into standby. Pressing the button when it's labeled  $\rightarrow$ OPR switches the SKY497 out of standby and into operating mode.



**Label for Operating Mode Button** This on-screen label identifies the function of the adjacent button. The  $\rightarrow$ STB label appears on the traffic screen and means *go to standby*. The  $\rightarrow$ OPR label appears on the standby screen and means *go to operating mode*. If your aircraft has a squat switch, the  $\rightarrow$ STB label only appears when your aircraft is on the ground.



**Display Range Button** Pressing this button when the SKY497 is in standby has no effect. Pressing the button when the SKY497 is in operating mode toggles through the SKY497 display ranges as reflected in the on-screen display range indicator.



**Display Range Indicator** This indicator (present only in operating mode) identifies the currently selected display range.



**Heading Flag** The heading flag appears when the heading input is invalid or missing. The heading flag disappears when a valid heading signal is supplied. The SKY497 *will* operate with a heading flag, but you may experience degraded performance, especially during high-rate-of-turn maneuvers.



**Vertical Display Mode Indicator** This indicator displays the name of the currently selected vertical display mode: ABV (above/look up), BLW (below/look down), or NRM (normal). (See figure 1-6.) The indicator does not appear when the SKY497 is in standby.



**Vertical Display Mode Button** In operating mode, this button changes the SKY497 vertical display mode as reflected in the on-screen vertical display mode indicator. Pressing this button when the SKY497 is in standby has no effect.



**Label for Test Button** This on-screen label only appears when the SKY497 is in standby or in failed mode. It identifies the function of the adjacent button which is to start the operator-initiated self test.



**Test Button** Pressing this button when the SKY497 is in standby starts a SKY497 self test. Pressing this button in operating mode has no effect.



**Other Traffic (OT)** On the WX-1000/SKY497 display and on the RGC/radar indicator, this 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. On alternate displays (not including the RGC/radar indicator), this 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 be strapped to filter out all OT symbols.



**Proximity Advisory (PA) (not shown)** This white or cyan symbol only appears on alternate displays not including the RGC/radar indicator. A 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  $\pm 1200$  ft.

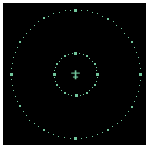


**Own Aircraft** This symbol (white or cyan on color alternate displays) represents your aircraft's relative position and heading.



**Off-Scale Traffic Advisory (TA)** This 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.



**Range Rings** The outer range ring corresponds to the selected display range. On a WX-1000/SKY497 display set on the 6 nmi display range, the outer range ring represents a distance of 6 nmi from your aircraft and the inner range ring represents a distance of 2 nmi. Figure 3-7 on page 3-4 shows the range ring arrangements for other display ranges.



**Standby Indicator** This indicator is displayed as long as the SKY497 is in standby except when the test screen is displayed during an operator-initiated self test. In standby, the SKY497 does not interrogate, process, or display traffic.



**Standby Indicator** A standby indicator such as this may be displayed on an alternate display to indicate that the SKY497 is in standby. In standby, the SKY497 does not interrogate, process, or display traffic. This message does not mean the SKY497 has been turned off (powered down). It is also possible for the display to display TCAS OFF instead of TCAS FAIL after a self test failure on the ground.



**Self Test Indicator** An indicator such as this may be displayed on an alternate display to indicate that the SKY497 operator-initiated self test is in progress.

**TCAS FAIL**

**SKY497 Failed Indicator** An indicator such as this may be displayed on an alternate display to indicate that the SKY497 is not powered up, or has failed, or has failed the operator-initiated self test. When displayed to indicate that the SKY497 is not powered up, the message typically stays on the display for several seconds after the SKY497 is turned on. It is also possible for the display to display TCAS OFF instead of TCAS FAIL after a self test failure on the ground.

**TA ONLY**

**TA ONLY Indicator** Whenever the SKY497 is on and not displaying a failure and not in standby, some alternate displays may display TA ONLY to indicate that the display is connected to a TCAS I or TAS system instead of a TCAS II system. The implication is that no resolution advisories will be issued. On some displays, when an active TA is detected, the background color of the TA ONLY indicator changes from white to amber.

## Controls Required for the *Stormscope* Option

**SKYWATCH/*Stormscope* Mode Switch** (not supplied)

This panel-mounted toggle switch determines whether traffic information or thunderstorm information is displayed.

The SKY497 and the WX-1000 continue tracking even if the switch is in the other position. If the SKY497 detects a TA or generates an error message when the switch is in the *Stormscope* position, the display switches to the traffic screen to display the TA or the error message until the TA no longer exists or the error message is dismissed.

**WX-1000 Maintenance Switch** (not supplied) This remote toggle switch (normally installed in the avionics bay near the WX-1000 processor) has a Normal position and an Override (WX-1000 maintenance) position. It should only be moved to the Override position when the WX-1000 processor is removed or powered down at the circuit breaker, and you still want to use the SKY497.

## Control Panel for an Alternate Display (not supplied)

A customer-supplied discrete control panel provides a power switch for the SKY497 and the functions listed below (as needed) for displays that cannot provide these functions on their own. (If you're using only the RGC/radar indicator as your display, the control panel will consist of only a power switch.)

- Power Switch
- Operating Mode Switch
- Display Range Switch
- Vertical Display Mode Switch
- Test Switch

## Aural Announcements

**“Traffic, Traffic”** This aural component of a traffic advisory is announced once over the cockpit speakers or headset when a TA is first detected. (This announcement is not made if SKY497 audio is inhibited. See page 4-4 for details.)

**“Traffic Advisory System Test Passed”** This message is announced once over the cockpit speakers or headset after the SKY497 has passed an operator-initiated self test.

**“Traffic Advisory System Test Failed”** This message is announced once over the cockpit speakers or headset after the SKY497 has failed an operator-initiated self test.



# Chapter 3

## *Operating Instructions*

### Introduction

This chapter lists the SKY497 operating instructions and describes its fault modes.

### Turn On the SKY497

**CAUTION**

*To avoid power surges that could damage the SKY497 and the optional WX-1000, start your engines before turning on the SKY497.*

- 1. Turn the OFF/BRT knob clockwise to the desired display brightness.**

A startup screen similar to figure 3-1 appears and stays on the display until the power-on self test is complete. (The L-3 logo will replace the existing BFGoodrich logo sometime after the corporate transition is complete.)

If the SKY497 passes the test, and your aircraft has a squat switch, and your aircraft is on the ground, the standby screen appears (figure 3-2).

If the SKY497 passes the test, and your aircraft has a squat switch, and your aircraft is in the air, the traffic screen appears (set on the 6



*Figure 3-1. Startup Screen*



Figure 3-2. Standby Screen



Figure 3-3. In-Flight Traffic Screen

nmi display range and the *normal* vertical display mode).  
(See figure 3-3.)

If the SKY497 passes the test and your aircraft does not have a squat switch, the standby screen (figure 3-2) appears.

In standby, the SKY497 waits 5 minutes for critical sensors such as the barometric altimeter to warm up and come on line before it displays a failed screen due to the lack of the sensor input; however, if you switch into operating mode, the SKY497 only waits 2 seconds for the sensor inputs before it displays the failed screen.

If a failed screen similar to figure 3-4 appears, refer to the Failure Response section on page 3-7. For installations with an ARINC 429 barometric altitude input, turning on the SKY497 during flight causes a temporary Error 20 message while the system is syncing up to the 429 data source.



Figure 3-4. Failed Screen

## Run the Operator-Initiated Self Test

It is recommended, but not required that you run the operator-initiated self test before the first flight of the day and whenever you get a failed screen.

1. With the SKY497 in standby or failed mode, press the TEST button.

The SKY497 begins its self test and the test screen (figure 3-5) appears. Upon *successful* completion of the self test, you will hear “Traffic advisory system test passed” and the display will revert to the previous standby or traffic screen.



Figure 3-5. Test Screen

2. If you hear “Traffic advisory system test failed” or see a SKY497 failed screen, push the TEST button again. If it fails again, refer to the Failure Response section on page 3-7.
3. If you hear “Traffic advisory system test passed” without seeing the test screen, and the OFF/BRT knob is turned to BRT, turn off the SKY497 and contact your authorized L-3 Avionics Systems dealer for troubleshooting help.

## Switch Between Standby & Operating Mode

When you’re on the ground, you must manually switch out of standby if you want the SKY497 to display traffic information. The ability to switch out of standby on the ground in conjunction with the *above* display mode is especially useful for scanning the airspace around the airport before takeoff.

1. To manually switch into operating mode from the standby screen (figure 3-2), press the button labeled →OPR.

The SKY497 switches out of standby into the *above* display mode and 6 nmi range (figure 3-6).

If your aircraft has a squat switch and you don't *manually* switch out of standby, the SKY497 *automatically* switches out of standby 8 to 10 seconds after takeoff.



Figure 3-6. Traffic Screen on the Ground

2. To manually switch into standby from the traffic screen, press the button labeled →STB.

The SKY497 goes into standby and the display switches back to the standby screen. (If your aircraft has a squat switch, the →STB button label is not displayed while airborne, and the SKY497 will not go into standby while airborne.)

If your aircraft has a squat switch, the SKY497 also goes into standby automatically, 24 seconds after landing. This delay allows the SKY497 to remain out of standby during a touch-and-go maneuver.

## Change the Display Range

You can change the display range when the SKY497 is in operating mode.

1. Press the display range button to switch the display range between the available display ranges. Figure 3-7 shows the display ranges available on the WX-1000/SKY497 display.

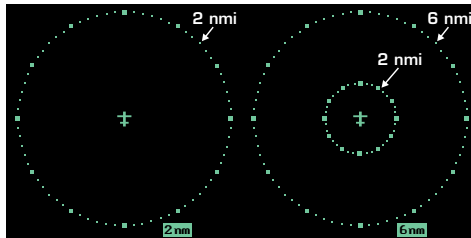


Figure 3-7. Display Ranges

With each press of the button, the screen changes to display the traffic detected within the chosen display range. The numerical value of the chosen display range is displayed next to the button.

The SKY497 continues to track up to 30 intruder aircraft within its maximum horizontal surveillance range (11 nmi radius) regardless of the display range selected.

## Change the Vertical Display Mode

You can change the vertical display mode when the SKY497 is in operating mode.

1. **Press the vertical display mode button to toggle between above, normal, and below.**

With each press of the button, the screen changes to display the traffic detected within the chosen vertical display mode (figure 1-6). The name of the chosen vertical display mode (ABV, NRM, or BLW) is displayed next to the button.

The SKY497 continues to track up to 30 intruder aircraft within its maximum vertical surveillance range ( $\pm 10,000$  ft) regardless of the vertical display mode selected.

## Switch Between SKYWATCH & Stormscope

If you have a *Stormscope* WX-1000 installed with the SKY497, you can switch between SKYWATCH and *Stormscope* screens (figures 1-2 and 1-3) using the remote SKYWATCH/*Stormscope* mode switch. Once in *Stormscope* mode, you can use the buttons on the display bezel to control *Stormscope* functions.

### WARNING

*If the SKY497 is in SKYWATCH mode, the display will not automatically switch into Stormscope mode to display thunderstorms or Stormscope errors. Use the remote SKYWATCH/Stormscope mode switch to periodically check for thunderstorms or Stormscope errors.*

The SKY497 does not superimpose SKYWATCH data on top of *Stormscope* data or vice versa; however, if the SKY497 is in *Stormscope* mode and the SKY497 detects a TA, the display automatically switches to SKYWATCH mode until the TA goes away. Also, if the SKY497 is in *Stormscope* mode and the SKY497 detects a failure, a special SKY497 failed screen appears that doesn't have a TEST button label, but does display the message

“Press Any Key to Ack.” Pressing any button (except the TEST button) or waiting 10 seconds switches the SKY497 back to *Stormscope* mode.

## Observe the Display

**WARNING**

*The SKY497 relies on information obtained from transponders in nearby aircraft. The SKY497 does not detect or track aircraft which are not equipped with an operating Air Traffic Control Radar Beacon System (ATCRBS) transponder.*

**WARNING**

*The SKY497 does not track intruder aircraft approaching at a closure rate greater than 900 knots.*

**WARNING**

*Some traffic within the chosen display range may not be displayed due to traffic prioritizing, antenna shielding, ground intruder filtering, or surveillance range being shorter than the chosen display range.*

**CAUTION**

*Optimum SKY497 performance is realized when intruder aircraft are reporting their altitude (via a mode C or other altitude reporting transponder).*

Monitor the activity of any traffic displayed. Keep in mind the following points when watching traffic on the display:

- Traffic Prioritizing – The SKY497 tracks up to 30 intruder aircraft simultaneously, but to reduce clutter, it displays only the 8 most threatening aircraft of those tracked.
- Ground Intruder Filtering – If a radio altimeter is connected to the SKY497, no traffic symbols are displayed for traffic detected under 380 ft Above Ground Level (AGL) when your aircraft is below 1,700 ft AGL.
- 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 be strapped to filter out all OT symbols.
- Refer to chapter 4 for a description of the TA criteria and other factors that affect the display of traffic symbols.

## Respond to Traffic Advisories

**WARNING**

*Do not attempt evasive maneuvers based solely on traffic information on the display. Information on the display is provided to the flight crew as an aid in visually acquiring traffic; it is not a replacement for Air Traffic Control (ATC) and See & Avoid techniques.*

When the SKY497 issues a TA, look outside for the intruder aircraft. When you spot an intruder aircraft, use normal right-of-way procedures to maintain separation.

## Turn Off the SKY497 and the Optional WX-1000

Rotate the OFF/BRT knob on the display bezel counterclockwise until the switch turns off.

## Operate the WX-1000 Without the SKY497

After removing the SKY497 for maintenance, maintenance personnel must install a jumper plug if you want to continue using the WX-1000.

## Operate the SKY497 Without the WX-1000

After removing the WX-1000 for maintenance, maintenance personnel will move the WX-1000 maintenance switch to the OVERRIDE (WX-1000 maintenance) position to allow continued operation of the SKY497.

## Failure Response

All errors indicated by a SKY497 Failed screen (figure 3-4) prevent continued operation of the SKY497 in SKYWATCH mode; however, error #20, Barometric Altitude Input, is a recoverable error. For example, if you turn on and try to operate the SKY497 before you turn on the barometric altitude source or before it comes on line, a SKY497 Failed screen appears with error #20 and continued operation of the SKY497 in SKYWATCH mode is not possible; but when you eventually turn on the barometric altitude source and it comes on line, the Failed screen disappears and operation returns to normal.

If you see a SKY497 Failed screen, respond as follows:

- 1. If the Barometric Input Error (#20) occurs, make sure the barometric altitude source has been turned on and given enough time to warm up.**

Most #20 errors are due to the failure of equipment external to the SKY497.

- 2. If any other error occurs, or if error #20 remains after 5 minutes, write down the error number and description; then, if you don't have a *Stormscope* WX-1000, skip to step 4.**
- 3. If the SKYWATCH/*Stormscope* mode switch is in the *Stormscope* position, switch it into the SKYWATCH position.**

- 4. Press the TEST button.**

The resulting self test may provide another error code to write down.

- 5. Remove power from the SKY497 at the circuit breaker.**

If you have a WX-1000 *Stormscope*, the display automatically switches into *Stormscope* mode once you disconnect power from the SKY497 regardless of the position of the SKY-WATCH/*Stormscope* mode switch.

- 6. Contact your authorized L-3 Avionics Systems dealer for troubleshooting help. Be sure to give the troubleshooting personnel the error numbers and descriptions that you wrote down.**

# Chapter 4

## Principles of Operation

### Introduction

This chapter describes Traffic Advisory (TA) criteria and other factors that affect the display of traffic symbols. Table 4-1 summarizes the criteria necessary for the SKY497 to display a TA.

Table 4-1. Ten Situations in Which a TA Will Occur

The SKY497 Will Issue a Traffic Advisory...				
No.	If Your Aircraft...	And Your Aircraft's Altitude Is...	And Your Landing Gear Is...	And An Intruder Aircraft Is Detected...
1	has a radio altimeter*	below 2000 ft AGL	[Sensitivity Level A]	within a 0.2 nmi horizontal radius and a $\pm 600$ ft relative altitude
2				within 15–20 sec. of CPA**
3		above 2000 ft AGL		within a 0.55 nmi horizontal radius and a $\pm 800$ ft relative altitude
4				within 20–30 sec. of CPA**
5	does not have a radio altimeter*	[Sensitivity Level A]	down	within a 0.2 nmi horizontal radius and a $\pm 600$ ft relative altitude
6				within 15–20 sec. of CPA**
7			up	within a 0.55 nmi horizontal radius and a $\pm 800$ ft relative altitude
8				within 20–30 sec. of CPA**
9			fixed	within a 0.55 nmi horizontal radius and a $\pm 800$ ft relative altitude
10				within 20–30 sec. of CPA**

[Sensitivity Level A]

[Sensitivity Level B]

\* Having a radio altimeter means having a compatible radio altimeter wired to the SKY497 and providing valid altitude information.

\*\* CPA means Closest Point of Approach.

## Sensitivity Levels

The SKY497 uses one of two sensitivity levels, A or B, to determine when to display a TA. Having two sensitivity levels allows the SKY497 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 a cylinder of airspace surrounding your aircraft defined by a 0.2 nmi horizontal radius and a height of  $\pm 600$  ft from your aircraft. (See figures 4-1 and 4-2.)

OR...

2. The intruder aircraft approaches your aircraft on a course that will intercept your aircraft 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 SKY497 uses sensitivity level A in the following situations (corresponds to numbers 1, 2, 5, and 6 in table 4-1):

1. Your aircraft has a radio altimeter and is below 2,000 ft AGL.
2. Your aircraft has no radio altimeter but its retractable landing gear is down.

### Sensitivity Level B

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

1. The intruder aircraft enters into a cylinder of airspace surrounding your aircraft defined by a 0.55 nmi horizontal radius and a height of  $\pm 800$  ft from your aircraft. (See figures 4-1 through 4-3.)

OR...

2. The intruder aircraft approaches your aircraft on a course that will intercept your aircraft within 20 or 30 seconds (within 20 seconds for a non-altitude reporting intruder aircraft; within 30 seconds for an altitude reporting intruder aircraft).

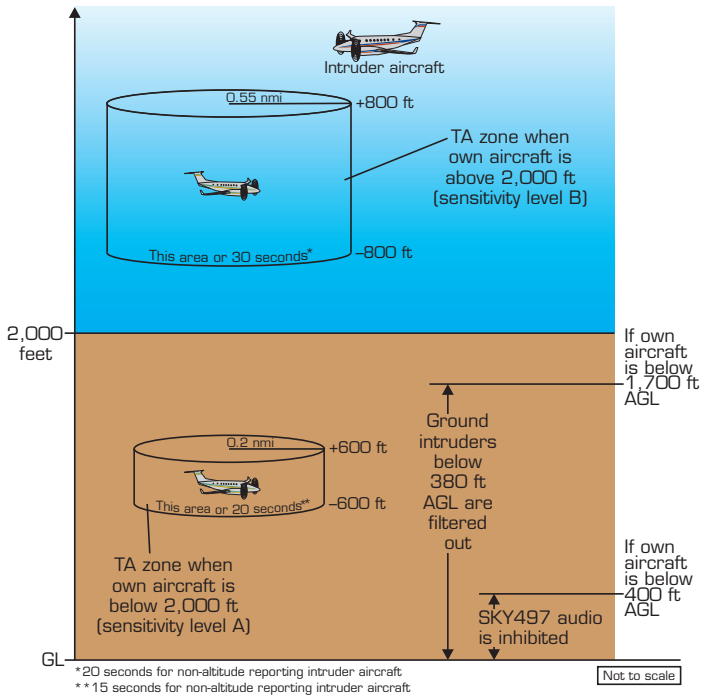


Figure 4-1. TA Zones If Your Aircraft Has a Radio Altimeter

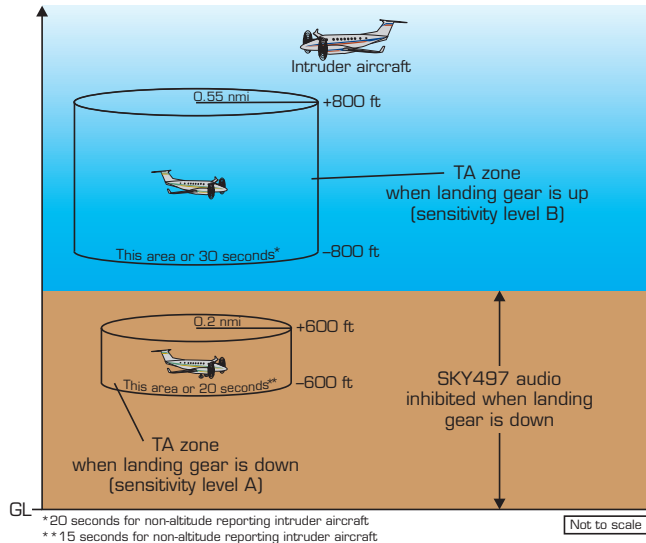
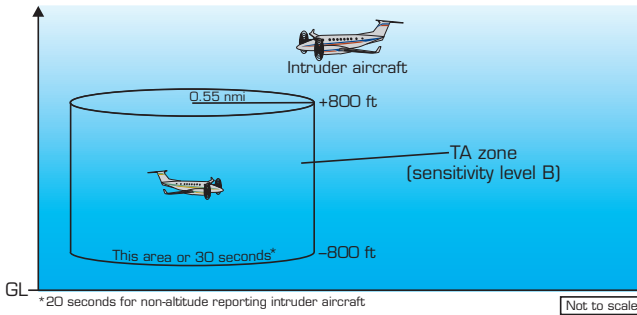


Figure 4-2. TA Zones If Your Aircraft Has No Radio Altimeter, But Does Have a Retractable Landing Gear



*Figure 4-3. TA Zones If Your Aircraft Has No Radio Altimeter and a Fixed Landing Gear*

The SKY497 uses sensitivity level B in the following situations (corresponds to numbers 3, 4, 7, 8, 9, and 10 in table 4-1):

1. Your aircraft has a radio altimeter and is above 2,000 ft AGL.
2. Your aircraft has no radio altimeter but its retractable landing gear is up.
3. Your aircraft has no radio altimeter and a fixed landing gear.

## Audio Inhibit, SKY497

This audio inhibit feature prevents the aural part of TAs, “traffic, traffic,” from being announced during takeoff and landing in order to minimize pilot distraction. The corresponding TA symbols are still displayed.

The SKY497 uses this audio inhibit feature in the following situations:

1. Your aircraft has a radio altimeter and you’re below 400 ft AGL. (See figure 4-1.)
2. Your aircraft has no radio altimeter but its retractable landing gear is down. (See figure 4-2.) (Audio is not inhibited if you have fixed landing gear and no radio altimeter.)

## Audio Inhibit, GPWS, EGPWS, or TAWS

If your aircraft has a Ground Proximity Warning System (GPWS), Enhanced GPWS (EGPWS), or Terrain Awareness and Warning System (TAWS) interfaced with the SKY497 and an alarm from one of those systems occurs, the SKY497 senses the alarm and delays the aural “traffic, traffic” component of any TAs issued until the alarm clears.

## 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 SKY497 continues to track the aircraft.

## Ground Intruder Filtering

Ground intruder filtering reduces the clutter of visual symbols and aural announcements that would otherwise be generated for intruder aircraft typically present on or near the ground near airports.

For intruder aircraft determined to be below 380 ft AGL, ground intruder filtering prevents the display of all traffic symbols (TA, PA, & OT) and suppresses the “Traffic, Traffic” aural announcement. (See figure 4-1.)

The SKY497 uses ground intruder filtering only if your aircraft has a radio altimeter connected to the SKY497 and you’re below 1,700 ft AGL.

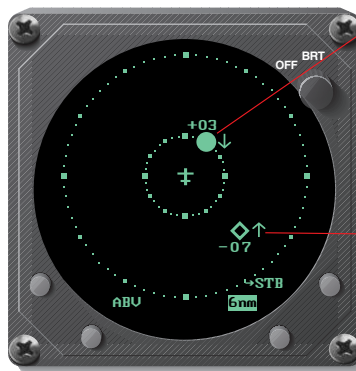


# Chapter 5

## *Display Interpretation*

### Introduction

This chapter explains the meaning of several sample screens. The abbreviation CPA used in some of the figures means closest point of approach.



**Traffic Advisory**  
Intruder aircraft at 1 o'clock, 2 nmi away, 300 ft above you, descending at a rate greater than 500 fpm. CPA within 20 to 30 seconds.

**Other Traffic**  
Intruder aircraft at 4:30, 4 nmi away, 700 ft below you, ascending at a rate greater than 500 fpm. No immediate threat. Displays as a PA (solid diamond) on alternate displays not including the RGC/ radar indicator.

*Figure 5-1. TA & OT on 6 nmi Range, ABV Mode*

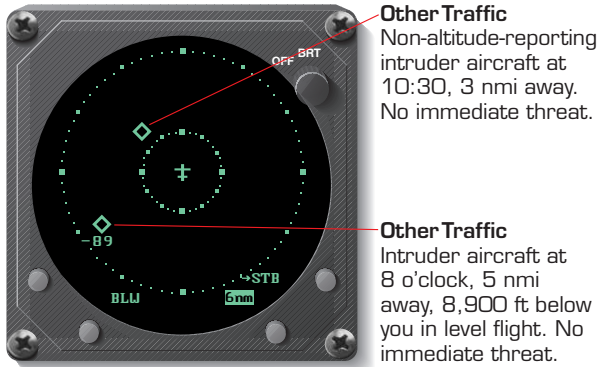


Figure 5-2. Other Traffic on 6 nmi Range, BLW Mode

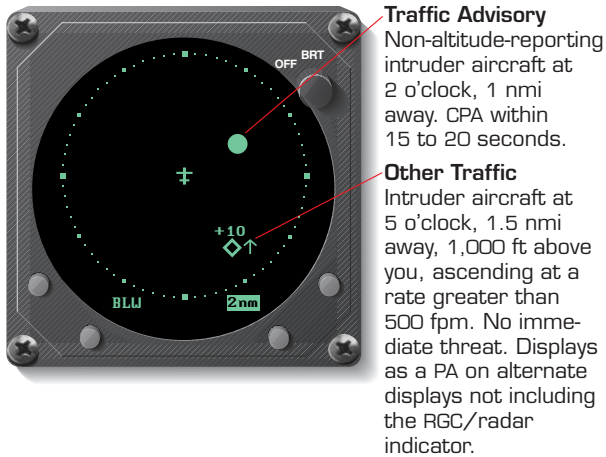


Figure 5-3. TA & OT on 2 nmi Range, BLW Mode

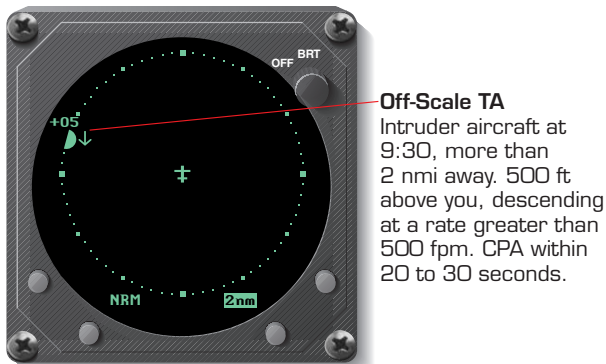
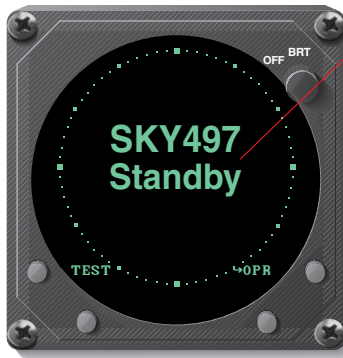


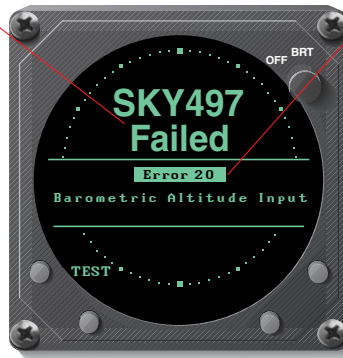
Figure 5-4. Off-Scale TA on 2 nmi Range, NRM Mode

**Standby**

When in standby, the SKY497 does not transmit interrogations or track intruder aircraft. Press the button labeled →OPR to begin tracking intruder aircraft. Some alternate displays may display "TCAS OFF" to indicate the SKY497 is in standby.

*Figure 5-5. Standby Screen*

**SKY497 Failed**  
Occurs any time the SKY497 detects an error that prohibits further operation of the SKY497 in SKYWATCH mode as long as the message remains on the screen. Some alternate displays may display "TCAS FAIL" to indicate the SKY497 failed or is not powered up.

**Error 20**

Indicates that the barometric input is missing or invalid. Once the valid barometric input returns, this screen goes away and normal operation resumes.

*Figure 5-6. Failed Screen*



# Chapter 6

## *Specifications*

Table 6-1. TRC497 Specifications\*

<p><b>Part Number:</b> 805-10800-001</p> <p><b>Size:</b> Not including mounting tray: 7.62 in (19.36 cm) high 3.56 in (9.04 cm) wide 12.52 in (31.90 cm) deep</p> <p><b>Weight:</b> Not including mounting tray: 8.94 lb (4.06 kg) Including standard mounting tray: 9.82 lb (4.45 kg) Including ruggedized mounting tray (for rotorcraft installations): 10.95 lb (4.97 kg)</p> <p><b>Tracking Capability:</b> Up to 30 intruder aircraft (displays only the 8 highest priority aircraft)</p> <p><b>Surveillance Range:</b> Horizontal tracking radius: 11 nmi maximum Relative altitude tracking range: ±10,000 ft maximum</p> <p><b>Display Ranges:</b> Horizontal display ranges with the WX-1000/SKY497 display: 2 and 6 nmi  Horizontal display ranges with alternate displays: 2 and 6 nmi on the RGC/radar indicator Various ranges generated by the other alternate displays</p>
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(Continues on next page)

\*Specifications subject to change without notice.

Table 6-1. TRC497 Specifications\* (Continued)

Vertical display modes (These numbers apply to the WX-1000/SKY497 display & the RGC with a radar indicator; the numbers may vary for other alternate displays):

- ±2,700 ft (normal)
- +9,000 ft to -2,700 ft (above/look up)
- +2,700 ft to -9,000 ft (below/look down)

**Range Accuracy:**

0.05 nmi typical

**Bearing Accuracy:**

- 5° RMS typical with NY156 antenna
- 7° RMS typical with NY164 antenna

**Altitude Accuracy:**

±200 ft

**Maximum Closure Rate:**

900 knots

**Power Input Requirements:**

11 to 34 V dc, 70 W (maximum)

**Transmitter Power Output:**

40 W peak (nominal)

**Operating Temperature:**

-55 to +70 °C (-67 to +158 °F)

**Storage Temperature:**

-55 to +85 °C (-67 to +185 °F)

**Operating Altitude:**

55,000 ft maximum

**Cooling:**

Conduction and forced air convection (internal fan)

**Certification Compliance:**

U.S. FAA TSO C147. Contact L-3 Avionics Systems for the latest foreign country certifications. Refer to the latest revision of FSAW 98-04 for Flight Standards Service (AFS) policy concerning follow-on field approvals.

**FCC**

Part 87 (FCC identifier PMYTRC497)

**RTCA Compliance:**

Environmental:

DO-160D Category:

F2XBAB[(SBM)(UFF1)]XXXXXXXXZBABA(UUK)L[XXXX]XXX

Software:

DO-178B Level D

\*Specifications subject to change without notice.

*Table 6-2. WX-1000/SKY497 Display Specifications\**

<p><b>Part Number Definition:</b> 78-8060-5900-8 (Black Bezel) 78-8060-5900-9 (Gray Bezel)</p> <p><b>Size:</b> 3.37 in (8.56 cm) high 3.37 in (8.56 cm) wide 8.24 in (20.92 cm) deep</p> <p><b>Weight:</b> 2.3 lb (1.0 kg)</p> <p><b>Power Input Requirements:</b> +15/-15 V dc, 0.7 A maximum (provided by the TRC497)</p> <p><b>Operating Temperature:</b> -20 to +55 °C (-4 to +131 °F)</p> <p><b>Storage Temperature:</b> -55 to +70 °C (-67 to +158 °F)</p> <p><b>Operating Altitude:</b> 55,000 ft maximum</p> <p><b>TSO Compliance:</b> C110a and C113</p> <p><b>RTCA Compliance:</b> DO-160C F1-CA(NBM)XXXXXXZXXXZUAXXXXXX</p>
--

\*Specifications subject to change without notice.

Table 6-3. Directional Antenna Specifications\*

<p><b>Part Number:</b> 805-10890-001 (Model NY164, a standard antenna) 805-10003-001 (Model NY156, an upgraded antenna)</p> <p><b>Size:</b> 1.30 in (3.25 cm) high 6.23 in (15.82 cm) wide 11.12 in (28.24 cm) deep</p> <p><b>Weight:</b> 2.3 lb (1.04 kg)</p> <p><b>Speed:</b> Rated to 600 knots (0.9 Mach) @ 25,000 ft</p> <p><b>Frequency:</b> 1,030-1,090 MHz</p> <p><b>TSO Category:</b> C118</p> <p><b>Environmental Category:</b> DO-160C F2-AC(CLM)XSFDfsXXXXXXXXL(2A)X</p> <p><b>Finish:</b> Gloss white Skydrol®-resistant polyurethane paint</p>
--

\*Specifications subject to change without notice.

# Record of Important Information

## Dealer Information

Name \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Telephone \_\_\_\_\_

## Equipment Information

Date of Purchase \_\_\_\_\_

Installation Date \_\_\_\_\_

TRC:

Model Number \_\_\_\_\_

Part Number \_\_\_\_\_

Serial Number \_\_\_\_\_

Mod Letter \_\_\_\_\_

Software Version \_\_\_\_\_

Antenna:

Model Number \_\_\_\_\_

Part Number \_\_\_\_\_

Serial Number \_\_\_\_\_

Mod Letter \_\_\_\_\_

Display:

Model Number \_\_\_\_\_

Part Number \_\_\_\_\_

Serial Number \_\_\_\_\_

Mod Letter \_\_\_\_\_

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**NOTE**

*To ensure that a new or repaired SKY497 meets the TSO, meets foreign government certification requirements, and meets L-3 Avionics Systems performance standards, your SKY497 must be installed and tested by an L-3 Avionics Systems authorized SKY497 dealer.*



**communications**

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L-3 Communications Avionics Systems, Inc.  
5353 52nd Street, S.E.  
Grand Rapids, MI 49512 USA  
(800)253-9525  
[www.L-3com.com/as](http://www.L-3com.com/as)

**SKYWATCH<sup>®</sup>**

SKY497