GARMIN GWX SERIES WEATHER RADAR SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The Garmin GWX-Series is a weather radar installed to help the pilot monitor areas of precipitation in the flight path of the airplane. This section gives a description and operation of the Garmin GWX-Series Weather Radar System.

B. The G1000 Integrated Avionics System uses different GWX Weather Radar System based on Airplane Software/Configuration. Make sure to read each section carefully, become familiar with the installed software version, refer to Chapter 34, G1000 Integrated Avionics System - Description and Operation. The procedures in this section are typical for the G1000 v.767.XX Family and the G1000 NXi software configuration unless otherwise noted in this document.

(1) The G1000 Software Version v.767.XX uses the GWX-68 Weather Radar System.

(2) The G1000 Software Version v.767.23 can use the GWX-68 or the GWX-70 Weather Radar System based on options delivered with the Airplane.

(3) The G1000 NXi Software uses GWX-70/75 Weather Radar System only.

(a) The G1000 NXi System Software versions up to (v.2499.08) and (v.2499.10 and on) add additional features from the GWX-70/75 System. To get these additional features, load the Turbulence Detection (TD) and Ground Clutter Suppression (GCS) Enable card. Refer to Chapter 34, Turbulence Detection (TD) and Ground Clutter suppression (GCS) Enable Configuration (G1000 System Software up to v.2499.08) and G1000 NXi GWX TD GCS Configuration (G1000 System Software v.2499.10 and On) sections.

(4) The GWX 75 Weather Radar is only compatible with G1000 System Software v.2499.10 and on.

(a) The G1000 NXi Phase 3 software adds some additional features from the GWX-75 System. The only new feature added is multi-core processor in the GWX 75 Weather Radar System.

2. Description

A. Garmin GWX-Series Weather Radar.

(1) The GWX-Series weather radar is installed behind a radome on the right wing. The weather radar assembly includes an antenna, receiver, and transmitter in one assembly.

(a) The GWX-70/75 weather radar is installed behind a radome on the right wing. The weather radar assembly includes the receiver transmitter base and the antenna with a 10 inch dish (254 mm), which bolts to the base.

(2) The weather radar is adjustable to many scan profiles (20 to 90 degrees) and gives a high-definition target display. The system also includes a vertical scan function to help the pilot look at thunderstorm tops, gradients and cell buildup activity at many altitudes. The GWX-Series Weather Radar has extended Sensitivity Time Control (or STC) logic that digitally integrates weather attenuation and distance compensation. This component prevents a display change in the size of severe weather cells as distance to the cells changes.

(3) Garmin's WATCH (Weather Attenuated Color Highlight) feature identifies shadow effects of short-range cell activity. This system identifies the areas behind intense weather cells, or large areas of less intense precipitation, where the radar display can be less accurate.

(4) The GWX-68/75 weather radar also has an Automatic Target Alert feature that looks ahead for intense cell activity in the 80 to 320 nautical mile range. This component will give a warning, even if the pilot does not actively monitor the displays.

(a) The GWX-70 weather radar has an Automatic Target Alert feature that looks ahead for intense cell activity in the 80-240 nautical mile range. This component will give a warning, even if the pilot does not actively monitor the displays.

NOTE: The GWX-70 weather radar can be set to the 320 nautical mile range, but its operation is limited to 240 nautical miles on the Model 208/208B.

(5) The GWX 75 weather radar offers a redesigned hardware platform that supports standard and advanced weather features. Operation and display range selection up to 320 nautical miles, horizontal scan and sector settings up to 90 degrees (45 degrees right and 45 degrees left), vertical scan capability of plus/minus 30 degrees, manual tilt capability of plus/minus 15 degrees.

3. Operation

A. Garmin GWX-Series Weather Radar.

(1) The weather radar on this airplane is a typical weather radar installation. It uses pulsed microwave signals, transmitted by the phased array antenna to look for reflections (echoes) of precipitation. The reflected signal is

received by the same phased array antenna. Detection is a two-way process that needs 12.36 ms for a signal to travel out to the target and come back to the antenna. The center of the phased array antenna has a higher signal energy, which decreases toward the edge of the antenna.

(2) The weather radar gives real time precipitation returns to the flight crew and is displayed on the Multi-Function Display (MFD) and on both the pilot and co-pilot's Primary Flight Displays (PFD), and is shown on the inset map. The system uses a four-color display to show intensity and location of precipitation.

(3) The weather radar communicates with the Garmin G1000 avionics system gives the operational features that follow.

- GWX-68 weather radar range modes of 2.5, 5, 10, 20, 40, 60, 80, 100, 120, 160, and 320 nautical miles.
- GWX-70 weather radar range modes of 2.5, 5, 10, 20, 40, 60, 80, 100, 120, 160 and 240 nautical miles.
- Vertical scan angle of 60 degrees
- Horizontal scan mode (20 to 90 degrees)
- Weather and ground mapping modes.

(4) The standard GWX 75 weather radar system will feature the following capabilities

- GWX-75 weather radar range modes of 2.5, 5, 10, 20, 40, 60, 80, 100, 120, 160, 200, 240 and 320 nautical miles.
- Vertical scan angle of +/- 30 degrees.
- Horizontal scan mode and sector settings up to 90 degrees (45 degrees right and 45 degrees left for the Caravan installation due to weather radar pod location).
- Manual tilt capability of +/- 15 degrees.
- Weather and ground mapping modes.

(5) The weather radar communicates to the Garmin G1000 system through the HSDB bus and MFD. The weather radar receives power through the RADAR R/T circuit breaker on the avionics circuit breaker panel.