# GARMIN G1000 TERRAIN AWARENESS WARNING SYSTEM - DESCRIPTION AND OPERATION

## 1. General

A. This section gives the description and operation of the Garmin G1000 Terrain Awareness Warning System (TAWS-B). The Model 208 avionics system has an optional terrain awareness warning system (TAWS-B) installed to increase situational awareness and to help prevent controlled flight into terrain (CFIT).

B. TAWS-B is an optional system on this airplane and must have the components that follow before it can operate correctly.

(1) The system must have a valid global positioning system (GPS) position indication.

(2) The system must have a valid terrain/obstacle database.

C. The TAWS system must be enabled (unlocked) if the baseline software is loaded to the Garmin G1000 Integrated Avionics System. Refer to G1000 TAWS Enable Configuration.

## 2. Description

A. TAWS-B Display.

(1) Terrain is shown on the TAWS-B page in three colors: black, yellow, and red. Refer to Table 1 for a general description of the TAWS-B color codes. Obstacles are also given on the TAWS-B page. There are five symbols given by the TAWS-B system: unlighted obstacles (less than 1000 feet AGL), lighted obstacles (less than 1000 feet AGL), unlighted obstacles (more than 1000 feet AGL), lighted obstacles (more than 1000 feet AGL), and possible impact points.

***Table 1. TAWS-B Terrain and Obstacle Colors***

| Color | Terrain/Obstacle Location | Alert Level | Pilot Action |
|---|---|---|---|
| Red | Terrain or obstacle at or within 100 feet below current airplane altitude. | WARNING | Climb and/or turn away from the terrain or obstacle. |
| Yellow | Terrain or obstacle between 100 and 1000 feet below current airplane altitude. | CAUTION | Know location of obstacle. Be prepared to take action. |
| Black | Terrain or obstacle is more than 1000 feet below airplane altitude. | No Danger | No action necessary. |

B. GPS Position and GPS-MSL Altitude.

(1) Garmin TAWS-B uses horizontal position and altitude data given by the GPS system to calculate a mean sea level (MSL) based altitude (GPS-MSL altitude). The GPS-MSL altitude is then used by the TAWS-B system to give terrain alerts. GPS-MSL altitude does not need a correct local altimeter setting to find MSL altitude. This makes the GPS-MSL altitude a very accurate and useful way to calculate terrain and obstacle alerts. TAWS-B also uses GPS-MSL altitude to calculate possible flight paths of the airplane and give advanced alerts.

C. TAWS-B Terrain and Obstacle Databases.

(1) The TAWS-B system uses terrain and obstacle databases that are referenced by MSL altitude. The TAWS-B system compares the calculated GPS-MSL altitude to the MSL altitude included in the two databases. The TAWS-B system then makes a two-dimensional picture on the cockpit displays of the terrain and obstacles near the airplane and indicates their altitudes relative to the airplane.

D. TAWS-B Alerts.

(1) Alerts are issued when flight conditions meet parameters that are set within TAWS-B software algorithms. TAWS-B alerts typically use a CAUTION or a WARNING alert severity level, or both. When an alert is issued, visual annunciations are displayed and aural alerts are simultaneously issued.

## 3. Operation

A. TAWS-B Operation.

(1) When electrical power is applied to the airplane the TAWS-B system will start with the avionics equipment. During the start procedure, the TAWS-B system completes a self test. If the system operates correctly, a TAWS-B SYSTEM TEST, OK message is shown on the multifunction display (MFD). If the TAWS-B system does not operate correctly a

TAWS-B SYSTEM FAILURE message will come on the MFD.

(2) The TAWS-B page is on the Map Page Group group of pages on the MFD. Use the MFD outer FMS knob to select the Map Page Group. Once in the Map Page Group, use the MFD inner FMS knob to select the TAWS-B page.

(3) The TAWS-B page has two settings:

- 360-Degree View - View from above the airplane to show terrain and obstacles on all sides of the airplane
- 120-Degree View - View of terrain ahead of and 60 degrees to the left and right of the airplane's flight path.

(4) To select the setting necessary do one of the steps that follows:

(a) Push the VIEW softkey on the MFD and select 360° or ARC and then push the ENT key.

(b) Push the MFD MENU key on the MFD and select View 360° or View ARC and then push the ENT key.

(5) The MFD joystick is used to set the TAWS-B map range to between 1 nm to 200 nm.

(a) Use the RANGE key (joystick) to select a range for the TAWS-B display.

(6) Aviation data can also be set to show or not show on the TAWS-B page. Aviation data includes airports, VOR's, and other navigational aids.

(a) To select the aviation data on or off, push the MENU key on the MFD , select SHOW (or HIDE) AVIATION DATA?, and push the ENT key.

(7) TAWS-B has an Inhibit Mode that can be used to disengage aural and visual alerts when the crew thinks that they are not necessary. During Inhibit Mode, the TER INHB indication is shown on the primary flight displays (PFD's).

(8) To select the TAWS Inhibit or Enable Mode do one of the steps that follows:

(a) Push the MFD MENU key and select INHIBIT TAWS or ENABLE TAWS, and push the ENT key.

(b) Push the MFD MENU key and select INHIBIT TAWS or ENABLE TAWS, and push the ENT key.

B. TAWS-B Alerts.

(1) When an alert is issued, annunciations appear on the PFD and MFD. The TAWS-B Alert Annunciation is shown to the upper left of the Altimeter on the PFD and below the Terrain Legend on the MFD. If the TAWS-B Page is not displayed at the time, a pop-up alert appears on the MFD.

(2) To acknowledge the pop-up alert:

(a) Press the CLR Key.

1 Returns to the currently viewed page.

(b) Press the ENT key.

1 Accesses the TAWS-B Page.