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**DOCUMENT NOTES:**
1. PRINTS WILL NOT ACCOMPANY THIS RELEASE
2. RELEASING P/L TO REFLECT ESTABLISHED EFFY
3. SERIAL CONFIRMED
4. EXPERIMENTAL RELEASE
5. SUPERSEDED IN ENG FILES ONLY
6. CANCELLED
7. INACTIVE
8. NEVER USED
9. OBSOLETE
N DOC NOT REQD FOR CERTIFICATION

**GENERAL NOTES:**

**DISTRIBUTION:**
CESSNA AIRCRAFT COMPANY
P.O. Box 7704
WICHITA, KANSAS 67277

G1000 SYNTHETIC VISION TECHNOLOGY
OPTION ICA Supplement

MODEL NO: 172R/172S

SUPPLEMENT NO: ICA-172-34-00001

SUPPLEMENT DATE: 3/06/2009

PREPARED BY: Ben Morrow

CHECKED BY: Patrick Konecny

APPROVED BY: Mike McClary

APPROVED BY: Brian Richardet
## REVISIONS

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<th>Date</th>
<th>By</th>
<th>Approved By</th>
</tr>
</thead>
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<tr>
<td>-</td>
<td>03/06/09</td>
<td>Ben Morrow</td>
<td>See Title Page</td>
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ECR 064329

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1. INTRODUCTION HEADING

1.1. Purpose

1.1.1. The purpose of the Instructions for Continued Airworthiness Supplement is to provide the maintenance technician with the information necessary to ensure the correct functionality and performance of the G1000 Synthetic Vision Technology (SVT) Option on the Cessna Model 172R/172S.

1.1.2. This supplemental document is designed to satisfy the required 14 CFR 23.1529 “Instructions for Continued Airworthiness” requirements associated with this installation. This document is a supplement to the Model 172R/172S Maintenance Manual and may or may not be incorporated.

1.1.3. If this information is incorporated into the Model 172R/172S Maintenance Manual, the maintenance manual shall take precedence over this supplemental document. Refer to the application ATA chapter and section of the respective Maintenance Manual for the status of all ICA Supplements applicable to your model.

**NOTE:** This document must be placed with the aircraft operator’s Technical Library CD-ROM or Maintenance Manual and incorporated into the operator’s scheduled maintenance program.
2. APPLICABILITY

2.1. Effectivity

This Instructions for Continued Airworthiness (ICA) supplement is effective for the following aircraft model(s) and serialization where this G1000 Synthetic Vision Technology Option is installed:

<table>
<thead>
<tr>
<th>Model</th>
<th>Beginning Effectivity</th>
<th>Ending Effectivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>172R</td>
<td>Factory Option 172081547</td>
<td>-999999</td>
</tr>
<tr>
<td>172S</td>
<td>Factory Option 172S010930</td>
<td>-999999</td>
</tr>
<tr>
<td>172R</td>
<td>SB09-34-TBD</td>
<td>-999999</td>
</tr>
<tr>
<td>172S</td>
<td>SB09-34-TBD</td>
<td>-999999</td>
</tr>
</tbody>
</table>

Table 1 Installation ICA Effectivity

2.2. Complete ICA Documents

2.2.1. The following document(s), in conjunction with this supplement, constitute the Instructions for Continued Airworthiness for the G1000 Synthetic Vision Technology Option system. All items must be available to the operator at initial delivery.

- Model 172R/172S Wiring Diagram Manual
- Model 172R/172S Maintenance Manual
- 190-00384-09 Rev A or Later Garmin G1000 Cessna NAV III Cockpit Reference Guide
- AFM Supplement 172RPHAUS-S12-00 “Garmin G1000 Synthetic Vision Technology (SVT)”.

Or

- AFM Supplement 172SPHAUS-S12-00 “Garmin G1000 Synthetic Vision Technology (SVT)”.

Or

- AFM Supplement 172RPHBUS-S9-00 “Garmin G1000 Synthetic Vision Technology (SVT)”.

Or

- AFM Supplement 172SPHBUS-S11-00 “Garmin G1000 Synthetic Vision Technology (SVT)”.
3. DESCRIPTION AND OPERATION

3.1. Description

ECR 064329, "GARMIN SYNTHETIC VISION (SVT) FOR NAV III", defines the requirements for the installation of the Synthetic Vision Technology (SVT) option. This option provides a three-dimensional forward view of terrain, obstacle and traffic features on the PFD and on the MFD in reversionary mode. The imagery shows the pilot’s view of relevant features in relation to the aircraft altitude and attitude. Throughout this document and the Garmin Pilot Guide and Cockpit Reference Guide, SVT may also be referred to as Synthetic Vision System (SVS).

3.2. Operation

SVT is activated from the Primary Flight Display (PFD) using the softkey located along the bottom edge of the Display. Pressing the softkeys turns the related function on or off. When SVT is activated, the pitch ladder increments are reduced to 10 degrees up and 7.5 degrees down. SVT functions are displayed on three levels of softkeys. The PFD softkey leads into the PFD function softkeys, including synthetic vision. Pressing the SYN VIS softkey displays the SVT feature softkeys. The softkeys are labeled SYN TERR, HRZN HDG, and APTSIGNS. The BACK softkey returns to the previous level of softkeys. SVT must be active before any other SVT feature may be activated.

HRZN HDG and APTSIGNS softkeys are only available when the SYN TERR softkey is activated (gray with black characters). After activating the SYN TERR softkey, the HRZN HDG and APTSIGNS softkeys may be activated in any combination to display desired features. When system power is cycled, the last selected state (on or off) of the SYN TERR, HRZN HDG and APTSIGNS softkeys is remembered by the system.
• SYN TERR softkey enables synthetic terrain depiction.
• HRZN HDG softkey enables horizon heading marks and digits.
• APTSIGNS softkey enables airport signposts.


NOTE: Pathways is configured OFF due to functionality issues. When the functionality is corrected, Pathways will be turned on and the ICA will be updated at that time.
3.3. System Component(s)

3.3.1. GDU10XX SD Card, SVS Unlock

Garmin supplied Secure Digital (SD) card (P/N 010-00330-54) is required to unlock the SVT option on single PFD G1000 Systems such as the 172R/172S NAV III airplane.

NOTE: Once SVT is unlocked on an airplane then the SD card is married to that S/N airplane. The unlock card cannot be used on other S/N airplanes. The unlock card is supplied as loose equipment on new airplanes and is also included in SB09-34-TBD. The unlock card should be kept with the airplane.

3.3.2. GDU10XX SD Card, Supplemental SVS Data

Garmin supplied SD Card (P/N 010-00330-43), which is provided as standard equipment at S/N 172-081545, 172S-010873 and on or is included in SB09-34-TBD for earlier airplanes, contains the high definition terrain database (9-arc/second resolution) that is required with the SVT option. The SD Card resides in the bottom SD card slot on the PFD and MFD. This card replaces P/N 010-00330-42 SD Card (30-arc/second resolution).

3.3.3. G1000 System Software

Cessna supplied software support CD supporting NAV III Garmin G1000 System Software 006-B0563-14 or later must be installed on the aircraft; also known as v563.14. The v563.14 is provided as standard equipment at 172-081547, 172S-010930 and on or is included in SB09-34-TBD for earlier airplanes.

NOTE: The 006-00563-14 software is the minimum required software needed to support the SVT option. When installing the SVT option always use the latest software as long as it is -14 or greater. The Software Support CD is included as loose equipment on the airplane and may be found in the POH/AFM binder.

3.3.4. Garmin GDU 1040 or 1044B

SVS is displayed on the PFD, GDU 1040 (non-GFC-700 AFCS Models) or 1044B, which consists of a 10.4 inch LCD display with 1024x768 resolution. The GDU configured as a Primary Flight Display or PFD links to the MFD and displays all functions of the G1000 System during flight. The displays communicate throughout the system via a High-Speed Data Bus (HSDB) connection.
3.4. Aircraft Wiring

3.4.1. Interior Wiring

N/A

3.4.2. Avionics Wiring

There are no wiring changes needed to support the SVT installation option. The existing standard wiring supports the function. Refer to Chapter 34 (Navigation), of the Model 172R/172S Wiring Diagram Manual for avionics wiring definition of the G1000 System as installed standard that supports the Synthetic Vision Technology Option.
4. REMOVAL AND INSTALLATION

NOTE: If applicable, make sure that the aircraft is configured for maintenance as defined by the associated system in the maintenance manual or in this document, including the removal of electrical power, avionics power, etc., prior to removal or installation of aircraft components.

4.1. GDU 1040/1044B (P/N 011-00972-00 or -03, P/N 011-01274-00)

Note: If the PFD/MFD is removed and the same one reinstalled then no action is required.

4.1.1. GDU 1040/1044B PFD Removal/Installation

1. Refer to Chapter 34 (Navigation), 34-60-10 Maintenance Practices, Section 3 or appropriate software Service Bulletin for parts and instructions on loading system software and configuration files.

2. SVT configuration will not be overwritten (disabled) unless the NAV III configuration has been updated. In this case refer to Attachment 1, Section 2.1 within this document and perform steps to unlock SVT functionality.

4.1.2. GDU 1040/1044B MFD Removal/Installation

1. Refer to Chapter 34 (Navigation), 34-60-10 Maintenance Practices, Section 3 or appropriate software Service Bulletin for parts and instructions on loading system software and configuration files.

2. SVT configuration will not be overwritten (disabled) unless the NAV III configuration has been updated. In this case refer to Attachment 1, Section 2.1 within this document and perform steps to unlock SVT functionality.

4.1.3. G1000 System Software & Configuration Files

1. Anytime the NAV III configuration is updated for the G1000 system the SVT functionality for the aircraft installation is disabled. Refer to Garmin G1000 Line Maintenance Manual for Cessna NAV III, P/N 190-00352-00 Rev N or Later or appropriate Cessna Software Service Bulletin for parts and instructions on loading system software. Refer to attachment 1, Section 2.1 within this document and perform steps to unlock SVT functionality.
5. MAINTENANCE AND SPECIAL TOOLS
5.1. Maintenance

NOTE: The Cessna NAV III Garmin G1000 software CD and SVS unlock SD card are needed when loading system software and unlocking the SVS function. These items should be stored as loose equipment on the airplane. Also refer to the Maintenance Manual chapter 34 (GIA 63 Integrated Avionics Installation – Maintenance Practices) for additional information on software loading.

GDU1XXX SD Card, SVS Unlock P/N 010-00330-54

Cessna NAV III Garmin G1000 Software Loader CD supporting system software version v563.14 at minimum must be installed.

5.2. System Wiring

Refer to the Wiring Diagram Manual, Chapter 23, Communications - General, for maintenance requirements and practices. SVT is a software function only and does not require any specific system wiring changes from the Type Certified Model 172R/172S airplane.

6. TESTING, RETURN TO SERVICE AND TROUBLESHOOTING
6.1. Adjustment/Test

For the Garmin GDU 1040 and GDU 1044B, refer to Chapter 34 (Navigation), 34-60-10 Maintenance Practices or Garmin G1000 Line Maintenance Manual for Cessna NAV III, P/N 190-00352-00 Rev N or Later.

For verification of the SVT functionality refer to Attachment 1, Section 3.1 of this document.

6.2. Inspection/Check

Refer to Garmin G1000 Line Maintenance Manual for Cessna NAV III, P/N 190-00352-00 Rev N or Later.
6.3. Troubleshooting

The SVT software feature requires the following G1000 sensors/data to be valid:

- Attitude & Heading (AHRS)
- GPS Position
- 9-arc/second terrain data

In the event that one of the above items fails or is unavailable, the SVS feature is automatically removed from the PFD in normal mode or the MFD in reversionary mode. The following table describes possible symptoms associated with the SVT function, and provides corresponding actions for troubleshooting:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Recommended Action</th>
</tr>
</thead>
</table>
| "SYN VIS" softkey does not appear on PFD softkey tier. | Verify that the PFD and MFD software versions are shown to be GDU 9.05 or later (System software v563.14 or later), by checking the AUX – System Status Page on the MFD.  
If GDU 9.05 version or later software is installed in the PFD and MFD, follow the steps provided in Attachment 1, Section 2.1 to unlock the SVT feature. |
| 3D terrain presentation does not appear on PFD. | Verify that Synthetic Vision is activated by following the procedures outlined in SVT Upload Verification, included in Attachment 1, Section 3.1 of this document.  
Verify that P/N 010-00330-43 SD Card, Supplemental Data (includes 9-arc/second terrain database) are installed in the lower slot of the PFD and MFD.  
Verify that the alert messages shown in Table 3 are not displayed on the PFD Alerts Windows. If so, follow the solutions described in Table 3.  
Verify that the G1000 Attitude & Heading data are valid on the PFD. Verify that a valid GPS 3D position solution is being received. Troubleshoot these systems in accordance with Garmin Line Maintenance Manual 190-00352-00. If a terrain database update has just been performed, allow the system time to initialize and verify the data. When the databases have been verified, the current database cycle and version are reported on the MFD AUX – System Status Page. |
The following table provides SVS specific alert messages which may appear in the Alerts Window on the PFD (press the ALERTS softkey on the PFD to view the Alerts Window):

### Table 3 SVS-Related Alert Messages

<table>
<thead>
<tr>
<th>Failure Message</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVS – SVS DISABLED: Out of available terrain region</td>
<td>SVS is disabled because the aircraft exceeded the boundaries of the loaded terrain database.</td>
<td>Geographical operation limitations are defined in the SVS AFMS, which is referenced in 2.2.1. Ensure that operations are within this geographic area.</td>
</tr>
<tr>
<td>SVS – SVS DISABLED: Terrain DB Resolution too low</td>
<td>SVS is disabled because a 9-arc/second or better database is not currently loaded.</td>
<td>Ensure the P/N 010-00330-43 SD Card, Supplemental Data, are installed in the lower slot of each display. If terrain data has been recently updated, ensure that the correct 9-arc/second databases were used.</td>
</tr>
</tbody>
</table>
7. AIRWORTHINESS LIMITATIONS

7.1. Limitations and Replacement Intervals


NOTE: The Airworthiness Limitations section is FAA-approved and specifies maintenance required under Section 43.16 and 91.403 of Title 14 Code of Federal Regulations, unless an alternative program has been FAA approved.

The SVT system has no mandatory replacement time, inspection interval, or structural inspection procedures, and has no impact on Cessna Aircraft Company Model 172R/172S Maintenance Manual, Chapter 5 Time Limits/Maintenance Checks.

7.1.1. Mandatory replacement times.

1. None

7.1.2. Mandatory inspection intervals.

1. None

7.1.3. Mandatory inspection procedures.

1. None
ATTACHMENT 1 SVT SYSTEM CONFIGURATION

Sections from Cessna Drawing 3931510 “SVT CONFIGURATION PROCEDURES”

<table>
<thead>
<tr>
<th>REQUIRED EQUIPMENT, DESCRIPTION</th>
<th>CESSNA INSTALLATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1000, GDU10XX SVT UNLOCK CARD</td>
<td>3910317-18</td>
</tr>
<tr>
<td>G1000, GDU10XX 9AS TERRAIN DB CARD</td>
<td>3910317-9</td>
</tr>
</tbody>
</table>

TABLE 1-2

2.1 SVT CONFIGURATION UPLOAD:

2.1.1 WITH THE SYSTEM STILL POWERED ON, OPEN THE PFD (ESS AND AVN BUS 1) AND MFD (AVN BUS 2) CIRCUIT BREAKERS.

2.1.2 REMOVE DATABASE CARDS 010-00330-43 (REF) FROM THE BOTTOM SLOTS OF THE PFD AND MFD.

2.1.3 PRESS AND HOLD THE ‘ENTER’ KEY ON THE MFD, CLOSE THE MFD (AVN BUS 2) CIRCUIT BREAKER.

2.1.4 RELEASE THE MFD ‘ENTER’ KEY WHEN THE FOLLOWING MESSAGE APPEARS:

![INITIALIZING SYSTEM]

2.1.5 VERIFY THE MFD HAS ENTERED CONFIG MODE. IF NOT, OPEN THE MFD CIRCUIT BREAKERS AND REPEAT STEPS 2.1.3 THROUGH 2.1.5.

2.1.6 INSERT SD LOADER CARD DEFINED IN TABLE 1-2 INTO TOP SLOT OF PFD.

2.1.7 REPEAT STEPS 2.1.3 THROUGH 2.1.5 FOR THE PFD, CLOSING BOTH PFD (ESS & AVN BUS 1) CIRCUIT BREAKERS.

2.1.8 USING THE INNER FMS KNOB ON THE PFD, GO TO THE SYSTEM GROUP ‘SYSTEM UPLOAD’ PAGE.

2.1.9 ACTIVATE THE CURSOR AND HIGHLIGHT ‘CONFIGURATION FILES’ IN THE AIRFRAME FIELD. TURN THE INNER FMS KNOB TO SELECT ‘CONFIGURATION FILES’ AND PRESS THE ‘ENT’ KEY.
2.1.10 USE THE OUTER FMS KNOB TO HIGHLIGHT 'Enable SVS Single PFD' IN THE FILE FIELD. TURN THE INNER FMS KNOB TO SELECT 'Enable SVS Single PFD' AND PRESS THE 'ENT' KEY.

2.1.11 PRESS THE LOAD SOFTKEY.

2.1.12 MONITOR THE STATUS OF THE UPLOAD. WHEN THE UPLOAD IS FINISHED, PRESS THE ENT KEY TO ACKNOWLEDGE THE FOLLOWING CONFIRMATION:

```
Upload Complete
COMPLETE
OK
```

2.1.13 VERIFY THE SUMMARY FIELD DISPLAYS COMPLETE:

```
SUMMARY
Upload of AIRFRAME configuration.....COMPLETED
```

2.1.14 OPEN THE PFD AND MFD CIRCUIT BREAKERS.

2.1.15 REMOVE THE SVT UNLOCK SD CARD FROM THE TOP CARD SLOT ON THE PFD.

NOTE: THE SVT UNLOCK CARD IS TO STAY WITH THE AIRCRAFT.

2.1.16 INSERT DATABASE CARDS 010-00330-43 (REF) INTO THE BOTTOM SLOTS OF THE PFD AND MFD.
3.1 **SVT UPLOAD VERIFICATION**

3.1.1 CLOSE THE PFD AND MFD CIRCUIT BREAKERS.

3.1.2 ON THE PFD, PRESS THE 'PFD' SOFTKEY.

3.1.3 ON THE PFD, VERIFY THE PRESENCE OF A 'SYN VIS' SOFTKEY ON THE FAR LEFT.

3.1.4 ON THE PFD, PRESS THE 'SYN VIS' SOFTKEY.

3.1.5 ON THE PFD, VERIFY THREE SOFTKEYS, BEGINNING WITH THE SECOND KEY FROM THE FAR LEFT, ARE LABELED AS FOLLOWS: 'SYN TERR', 'HRZN HDG', AND 'APTSIGNS' (SOME OR ALL MAY BE GREYED OUT).

3.2 **FIELD OF VIEW OPTION**

3.2.1 ON THE MFD, PRESS THE 'MENU' KEY.

3.2.2 SELECT 'MAP SETUP' FROM THE WINDOW THAT APPEARS.

3.2.3 PRESS THE 'ENT' KEY TO BRING UP THE MAP SETUP WINDOW.

3.2.4 ENSURE THE 'GROUP' IS SET TO 'MAP', CHANGING THE SETTING WITH THE FMS KNOBS IF NECESSARY.

3.2.5 USE THE OUTER FMS KNOB TO SELECT 'FIELD OF VIEW', AND THE INNER FMS KNOB TO CHANGE THE SELECTION TO 'ON'.
3.3 **POWER DOWN SYSTEM**

3.3.1 **VERIFY ALL CIRCUIT BREAKERS CLOSED (PFD & MFD).**

3.3.2 **AVIONICS MASTER OFF, BAT MASTER OFF, AND VERIFY STDBY BATT OFF.**