FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR

SOCATA TB20

WITH

BENDIX/KING® KLN 94 NAVIGATION SYSTEM

Reg. No. _____

Ser. No. _____

This supplement must be attached to the FAA Approved Airplane Flight Manual when the Bendix/King KLN94 GPS is installed in accordance with unit installation manual 006-10599-0004 Rev 4 and FAA Form 337 dated 4/20/2012

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DATE:

LOG OF REVISIONS

REV	PAGE(S)	DESCRIPTION	APPROVAL/DATE
-	All	Original issue.	See Cover.

TABLE OF CONTENTS

SECTION I- GENERAL

The KLN 94 GPS panel mounted unit contains the GPS sensor, the navigation computer, a Color LCD display, and all controls required to operate the unit. It also houses the data base card which plugs directly into the front of the unit.

The data base card is an electronic memory containing information on airports, navaids, intersections, DPs, STARs, instrument approaches, special use airspace, land data (roads, bodies of water, cities, obstacles, railroad tracks), and other items of value to the pilot.

Every 28 days, Bendix/King receives new aeronautical data base information from Jeppesen Sanderson for the North American data base region. (The land data is updated on a less frequent basis.) This information is processed and downloaded onto the data base cards. Bendix/King makes these data base card updates available to KLN 94 GPS users.

Provided the KLN 94 GPS navigation system is receiving adequate usable signals, it has been demonstrated capable of and has been shown to meet the accuracy specifications of:

VFR/IFR en route oceanic and remote, en route domestic, terminal, and instrument approach (GPS, Loran-C, VOR, VOR-DME, TACAN, NDB, NDB-DME, RNAV) operation within the U.S. National Airspace System, North Atlantic Minimum Navigation Performance Specifications (MNPS) Airspace and latitudes bounded by 74° North and 60° South using the WGS-84 (or NAD 83) coordinate reference datum in accordance with the criteria of AC 20-138, AC 91-49, and AC 120-33. Navigation data is based upon use of only the global positioning system (GPS) operated by the United States.

NOTE: Aircraft using GPS for oceanic IFR operations may use the KLN 94 to replace one of the other approved means of long-range navigation. A single KLN 94 GPS installation may also be used on short oceanic routes which require only one means of long-range navigation.

NOTE: The KLN 94 is qualified for BRNAV (Basic Area Navigation) operation in the European region in accordance with the criteria of AC 90-96. (Reference ICAO Doc 7030 Regional supplementary Procedures, JAA Technical Guidance Leaflet AUJ20X2 and Eurocontrol RNAV Standard Doc 003-93 Area Navigation Equipment Operational Requirements and Functional Requirements (RNAV).)

NOTE: **FAA approval of the KLN 94 does not necessarily constitute approval for use in foreign airspace.**

SECTION II - LIMITATIONS

A. The KLN 94 GPS Pilot's Guide, P/N 006-18207-0000, dated September, 2000 (or later applicable revision) must be immediately available to the flight crew whenever navigation is predicated on the use of the system. The Operational Revision Status (ORS) of the Pilot's Guide must match the ORS level annunciated on the Self Test page.

B. Navigation is prohibited within 60 n.m. of the north and south poles (i.e. at greater than 89° north and south latitudes).

C. IFR Navigation is restricted as follows:

1. The system must utilize ORS level 01 or later FAA approved revision.

2. The data on the self test page must be verified prior to use.

3. IFR en route and terminal navigation is prohibited unless the pilot verifies the currency of the aeronautical data base or verifies each selected waypoint for accuracy by reference to current approved data.

4. Instrument approaches must be accomplished in accordance with approved instrument approach procedures that are retrieved from the KLN 94 data base. GPS instrument approaches using the KLN94 are prohibited, unless the KLN94 unit's approach data is verified by the pilot or crew to be current.

   (a) The KLN 94 Quick Reference, P/N 006-18228-0000, Rev. 1 dated 8/2000 (or later applicable revision) must be immediately available to the flight crew during instrument approach operations.

   (b) Instrument approaches must be conducted in the approach mode and RAIM must be available at the Final Approach Fix.

   (c) APR ACTV mode must be annunciated at the Final Approach Fix.

(d) Accomplishment of ILS, LOC, LOC-BC, LDA, SDF, and MLS approaches are not authorized.

(e) When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS or Loran-C navigation.

(f) The KLN 94 can only be used for approach guidance if the reference coordinate datum system for the instrument approach is WGS-84 or NAD-83. (All approaches in the KLN 94 data base use the WGS-84 or the NAD-83 geodetic datums.)

5. For BRNAV operations in the European region:

(a) With 23 (24 if the altitude input to the KLN 94 is not available) or more satellites projected to be operational for the flight, the aircraft can depart without further action.

(b) With 22 (23 if the altitude input to the KLN 94 is not available) or fewer satellites projected to be operational for the flight, the availability of the GPS integrity (RAIM) should be confirmed for the intended flight (route and time). This should be obtained from a prediction program run outside the aircraft. The prediction program must comply with the criteria of appendix 1 of AC90-96. In the event of a predicted continuous loss of RAIM of more than 5 minutes for any part of the intended flight, the flight should be delayed, cancelled, or rerouted on a track where RAIM requirements can be met.

NOTE: Honeywell's Preflight, Version 2.0 or later computer based prediction program may be used for the RAIM prediction. Alternate methods should be submitted for approval in

accordance with Advisory Circular AC90-96.

6. The aircraft must have other approved navigation equipment appropriate to the route of flight installed and operational.

7. Accomplishment of RNAV SID/STAR/ODP are not authorised.

SECTION III - EMERGENCY PROCEDURES

A. If the KLN 94 GPS information is not available or invalid, utilize remaining operational navigation equipment as required.

B. If a "RAIM NOT AVAILABLE" message is displayed while conducting an instrument approach, terminate the approach. Execute a missed approach if required.

C. If a "RAIM NOT AVAILABLE" message is displayed in the en route or terminal phase of flight, continue to navigate using the KLN 94 or revert to an alternate means of navigation appropriate to the route and phase of flight. When continuing to use GPS navigation, position must be verified every 15 minutes using another IFR approved navigation system.

D. Refer to the KLN 94 Pilot's Guide, Appendices B and C, for appropriate pilot actions to be accomplished in response to annunciated messages.

SECTION IV - NORMAL PROCEDURES

A. OPERATION

Normal operating procedures are outlined in the KLN 94 GPS Pilot's Guide, P/N 006-18207-0000, dated September, 2000 (or later applicable revision). A KLN 94 Quick Reference, P/N 006-18228-0000 Rev. 1 dated 8/2000 (or later applicable revision) containing an approach sequence, operating tips and approach related messages is intended for cockpit use by the pilot familiar with KLN 94 operations when conducting instrument approaches.

B. SYSTEM ANNUNCIATORS/SWITCHES/CONTROLS

1. HSI NAV presentation (**NAV/GPS)** switch annunciator - May be used to select data for presentation on the pilot's HSI; either NAV data from the number one navigation receiver or GPS data from the KLN 94 GPS. Presentation on the HSI is also required for autopilot coupling.

2. Message **(MSG)** annunciator - Will flash (along with a large "M" on the right side of the KLN 94 screen) to alert the pilot of a situation that requires attention. Press the MSG button on the KLN 94 GPS to view the message. If a message condition exists which requires a specific action by the pilot, the message annunciator will remain on but will not flash. (Appendix B of the KLN 94 Pilot's Guide contains a list of all of the message page messages and their meanings).

3. Waypoint **(WPT)** annunciator - Prior to reaching a waypoint in the active flight plan, the KLN 94 GPS will provide navigation along a curved path segment to ensure a smooth transition between two adjacent legs in the flight plan. This feature is called turn anticipation. Approximately 20 seconds prior to the beginning of turn anticipation the WPT annunciator (along with a large "WPT" on the right side of the KLN 94 screen) will flash, going solid upon initialization of the turn, and extinguishing upon turn completion..

WARNING: **Turn anticipation is automatically disabled for FAF waypoints and those used exclusively in PD/STARS where overflight is required. For waypoints shared between PD/STARS and published en route segments (requiring overflight in the PD/STARS), proper selection on the presented waypoint page is necessary to provide adequate route protection on the PD/STARS.**

4. HSI course control  knob - Provides analog course input to the KLN 94 in **OBS** when the NAV/GPS switch/annunciator is in **GPS**. When the NAV/GPS switch annunciation is in **NAV**, GPS course selection in **OBS** mode is digital through the use of the controls and display at the KLN 94. The HSI course control knob must also be set to provide proper course datum to the autopilot if coupled to the KLN 94 in LEG or OBS.

NOTE: Manual HSI course centering in **OBS** using the control knob can be difficult, especially at long distances. Centering the D-bar can best be accomplished by pressing  and then manually setting the HSI pointer to the course value prescribed in the KLN 94 displayed message

5. GPS remote approach (**GPS APR ARM/ACTV**) switch/annunciator - Used to manually select or deselect approach **ARM** (or deselect approach **ACTV**). The remote switch annunciator also annunciates the stage of approach operation; either armed (**ARM**) or activated (**ACTV**). Sequential button pushes if in **ACTV** would first result in approach **ARM** and then approach arm canceled. Subsequent button pushes will cycle between the armed state (if an approach is in the flight plan) and approach arm canceled. Approach **ACTV** cannot be selected manually.

C. PILOT'S DISPLAY

Left/right steering information is presented on the pilot's HSI as a function of the NAV/GPS switch position.

D. AUTOPILOT COUPLED OPERATION

The KLN 94 may be coupled to the autopilot by first selecting **GPS** on the NAV/GPS switch. Manual selection of the desired track on the pilot's HSI course pointer is required to provide course datum to the autopilot. (Frequent manual course pointer changes may be necessary, such as in the case of flying a DME arc.) The autopilot approach mode (**APR**) should be used when conducting a coupled GPS approach.

NOTE: NAV or APR coupled DME arc intercepts can result in excessive overshoots (aggravated by high ground speeds and/or intercepts from inside the arc).

E. APPROACH MODE SEQUENCING AND RAIM PREDICTION

WARNING: **Familiarity with the en route operation of the KLN 94 does not constitute proficiency in approach operations. Do not attempt approach operations in IMC prior to attaining proficiency in the use of the KLN 94.**

NOTE: The special use airspace alert will automatically be disabled prior to flying an instrument approach to reduce the potential for message congestion.

1. Prior to arrival, select a STAR if appropriate from the **APT 7** page. Select an approach and an initial approach fix (IAF) from the **APT 8** page. The most efficient means of getting to these pages is initiated by pressing the **PROC** button on the KLN 94.

   a. Press **PROC** button.

   b. Select Approach, Arrival, or Departure.

   c. Select the Airport from the list or enter the desired Airport identifier.

d. The **APT 7** or **APT 8** page will be displayed as appropriate.

NOTE: To delete or replace a DP, STAR or approach, select **FPL 0** page. Place the cursor over the name of the procedure, press **ENT** to change it, or **CLR** then **ENT** to delete it.

2. En route, check for RAIM availability at the destination airport ETA on the **AUX 3** page.

NOTE: RAIM must be available at the FAF in order to fly an instrument approach. Be prepared to terminate the approach upon loss of RAIM.

3. At or within 30 nm from the airport:

   a. Verify automatic annunciation of APR **ARM**.

   b. Note automatic d-bar scaling change from ± 5.0nm to ± 1.0 nm over the next 30 seconds.

   c. Update the KLN 94 altimeter baro setting as required.

   d. Internally the KLN 94 will transition from en route to terminal integrity monitoring.

4. Select **NAV 4** page to fly the approach procedure.

   a. If there is a need to fly a procedure turn or holding pattern, fly in OBS until inbound to the FAF.

NOTE: OBS navigation is TO-FROM (like a VOR) without waypoint sequencing.

b. If receiving radar vectors, choose **VECTORS** as the IAF, activate vectors when the first vector for the approach is received, and leave the unit in **LEG** mode.

c. **NoPT** routes including DME arc's are flown in **LEG**. **LEG** is mandatory from the FAF to the MAP.

NOTE: NAV or APR coupled DME arc intercepts can result in excessive overshoots (aggravated by high ground speeds and/or intercepts from inside the arc).

WARNING: **Flying final outbound from an off-airport vortac on an overlay approach; beware of the DME distance increasing on final approach, and the GPS distance-to-waypoint decreasing, and not matching the numbers on the approach plate.**

5. At or before 2 nm from the FAF inbound:

a. Select the FAF as the active waypoint, if not accomplished already.

b. Select LEG operation.

6. Approaching the FAF inbound (within 2 nm.):

   a. Verify APR **ACTV**.

   b. Note automatic dbar scaling change from ± 1.0 nm to ± 0.3 nm over the 2 nm inbound to the FAF.

   c. Internally the KLN 94 will transition from terminal to approach integrity monitoring.

7. Crossing the FAF and APR **ACTV** is not annunciated:

   a. Do not descend.

   b. Execute the missed approach.

8. Missed Approach:

   a. Climb

   b. Navigate to the MAP (in APR **ARM** if APR **ACTV** is not available).

NOTE: There is no automatic **LEG** sequencing at the MAP.

   c. After climbing in accordance with the published missed approach procedure, press [D↤], verify or change the desired holding fix and press **ENT**.

GENERAL NOTES

- The aeronautical data base must be up to date for instrument approach operation.
- Only one approach can be in the flight plan at a time.

- Checking RAIM prediction for your approach while en route using the **AUX 3** page is recommended. A self check occurs automatically within 2nm of the FAF. APR **ACTV** is inhibited without RAIM.
- Data cannot be altered, added to or deleted from the approach procedures contained in the data base. (DME arc intercepts may be relocated along the arc through the **NAV 4** or the **FPL 0** pages).
- **Some approach waypoints do not appear on the approach plates (including in some instances the FAF).**
- Waypoint suffixes in the flight plan:

  i – IAF
  f – FAF
  m – MAP
  h - missed approach holding fix

- The DME arc IAF (arc intercept waypoint) will be a) on your present position radial off the arc VOR when you load the IAF into the flight plan, or b) the beginning of the arc if currently on a radial beyond the arc limit. To adjust the arc intercept to be compatible with a current radar vector, bring up the arc IAF waypoint in the **NAV 4** page scanning field or under the cursor on the **FPL 0** page, press **CLR**, then **ENT**. Fly the arc in LEG. Adjust the HSI or CDI course pointer with reference to the desired track value on the **NAV 4** page (it will flash to remind you). Left/right dbar information is relative to the arc. Displayed distance is not along the arc but direct to the active waypoint. (The **ARC** radial is also displayed in the lower right corner of the **NAV 4** page).
- The DME arc IAF identifier may be unfamiliar. Example: D098G where 098 stands for the 098° radial off the referenced VOR, and G is the seventh letter in the alphabet indicating a 7 DME arc.
- APR **ARM** to APR **ACTV** is automatic provided:

a. You are in APR **ARM** (normally automatic).
b. You are in **LEG** mode.
c. The **FAF** is the active waypoint.
d. Within 2 n.m. of the FAF.
e. Outside of the FAF.
f. Inbound to the FAF.
g. RAIM is available.

- Direct-To operation between the FAF and MAP cancels APR **ACTV**. Fly the missed approach in APR **ARM**.
- Flagged navigation inside the FAF may automatically bring up the message page stating:

  PRESS **PROC** BUTTON NOW FOR NAVIGATION

  Pressing the **PROC** button may usually restore navigation (not guaranteed) by changing from **APR ACTV** to **APR ARM**. Fly the missed approach.
- The instrument approach using the KLN 94 may be essentially automatic starting 30 nm out (with a manual baro setting update) or it may require judicious selection of the OBS and LEG modes.

SECTION 5 - PERFORMANCE

No Change.