Beechcraft

Super King Air® B200/B200C

Super King Air® B200GT/B200CGT

Super King Air® 350, 350ER, 350i,

350iER, 350C & 350CER

Pilot's Operating Handbook and FAA Approved Airplane Flight Manual Supplement

for
Collins FMS-3000 LPV Upgrade

This Supplement is Applicable to the Following Manual(s):
101-590010-425, 101-590010-479, 101-590168-1,
130-590031-181, 130-590031-235, 130-590031-245

Airplane Serial Number: _____

Airplane Registration Number: _____

FAA Approved by: _____

Stephen Gielisch, Lead ODA administrator
Textron Aviation Inc.
Organization Delegation Authorization
FAA Approved Under 14 CFR Part 183 Subpart D

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Beechcraft

LOG OF REVISIONS

Super King Air® B200/B200C

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Revision 3 - June, 2021

REV NO.	PAGE NO(S).	DESCRIPTION	DATE
IR	ALL	Initial Release	Feb 8, 2010
1	ALL	Reformatted and redated all pages. Shifted data.	Mar 4, 2011
	4	Revised Contents. Added Collins and Users sentence.	
	5	Changed aircraft to airplane and TSO-C129A Class B1/C1 to TSO-C146C Class Delta 4.	
	6 thru 8	Added RNP-1 and RNP-5 to Navigational Capabilities.	
	8	Added a period (4 places) and a hyphen.	
	9	Added a hyphen (2 places). Removed http://. Added a period (2 places). Changed AC 90-94 to AC 90-105.	
	10	Added a period. Changed aircraft to airplane.	
	11	Removed RNP.	
	12	Added FIR...Flight Information Region.	

Log Of Revisions (Cont'd)
P/N 337-00-0014
Revision 3 - June, 2021

REV NO.	PAGE NO(S).	DESCRIPTION	DATE
	13	Added LIMITS and GENERAL. Revised item 1.	
	14	Changed aircraft to airplane. Added a period and a colon. Changed East to east (2 places) and West to west (2 places).	
	15	Removed item 5, and renumbered remaining items.	
	16	Changed aircraft to airplane. Removed item 12.	
	17	Changed 15 to 11, MS to FMS and aircraft to airplane.	
	18	Changed 15 to 11.	
	19	Changed aircraft to airplane (2 places).	
	20	Changed requires to require (2 places) and aircraft to airplane (3 places).	
	21	Changed aircraft to airplane (3 places).	
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2	ALL	Redated all pages.	Mar 9, 2012
	1	Added 101-590010-425 and 130-590031-181 to applicable manuals.	
	10	Removed reference to (Q) routes.	
3	ALL	Redated all pages	Jun, 2021
	15	Added Temperature Compensation Limits	

CONTENTS

SECTION 1 - GENERAL

The information in this supplement is FAA-approved material and must be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the Collins FMS-3000 is used for LPV Approaches.

The information in this supplement supersedes or adds to the basic Pilot's Operating Handbook and FAA Approved Airplane Flight Manual only as set forth within this document. Users of the handbook are advised to always refer to the supplement for possibly superseding information and placarding applicable to operation of the airplane.

This supplement is part of, and must be placed in, the basic FAA Approved Airplane Flight Manual for airplanes equipped with the Collins Pro Line 21 Avionics System installed in accordance with STC No. SA10970SC. The information contained herein supplements the information of the basic FAA Approved Airplane Flight Manual (AFM) and the approved Pro Line 21 Airplane Flight Manual Supplement (AFMS). For limitations, procedures and performance information not contained in this supplement, consult the basic FAA Approved Airplane Flight Manual.

This airplane is certified in accordance with FAR 23 Commuter Category (B300/B300C) and Normal Category (B200/B200C/B200GT/B200CGT).

FLIGHT MANAGEMENT SYSTEM NAVIGATIONAL OPERATIONAL CAPABILITIES

The Collins FMS-3000 provides centralized control for navigation, flight planning, radio tuning, and fuel management functions.

For additional information, refer to The Operator's Guide, FMS-3000 v4.0 Flight Management System for King Air Series Aircraft. Publication Number 523-0816977-002117, 2nd Edition, dated 06 February 2009 or later.

NOTE

Use of joystick on Cursor Control Panel (CCP-3000) to enter waypoint should only be done in the PLAN MAP mode. Do not use the joystick waypoint function on the Present Position (PPOS) map.

When FMS is the selected NAV source, Course Deviation Indicator (CDI) scaling is as follows:

SCALE	OCEANIC (OCEANIC ANNUNCIATED)	ENROUTE	TERMINAL (TERM ANNUNCIATED)	VOR/DME/ RNAV APPROACH (APPR ANNUNCIATED)	GPS APPROACH (GPS APPR ANNUNCIATED)
Lateral	4 nm	2 nm	1 nm	1 nm	0.3 nm
Vertical	500 ft	500 ft	500 ft	250 ft	250 ft

SCALE	GPS SBAS APPROACH (LPV APPR or L/V APPR ANNUNCIATED)
Lateral	Angular Deviation
Vertical	Angular Deviation

Although most scale changes occur in a seamless manner, the pilot should expect to occasionally observe “jumps” in the lateral and vertical scale presentations as the airplane transitions through various phases of the approach.

Laterally -	Oceanic to En Route En Route to Terminal Terminal to GPS or GPS SBAS Approach
Vertically -	En Route VNAV to GPS, GPS SBAS or VOR/DME RNAV Approach

NAVIGATIONAL CAPABILITIES

The single or dual Collins FMS (Flight Management System) is approved under Technical Standard Orders (TSO) TSO-C115b and TSO-C146c Class Delta 4.

When the FMS is receiving appropriate navigation signals, it meets the accuracy specifications for the following operations:

OCEANIC AND REMOTE

In accordance with AC 20-130A and AC 20-138A, two FMS systems must be operating and receiving usable signals from two operating Collins GPS sensors and used in conjunction with a Pre-Departure GPS Coverage Predictor Program such as the Rockwell Collins, CPN 523-0778332-006117, Rev —, or later revision. For routes approved for single GPS navigation, a single FMS must be oper-

ating and receiving usable signals from the single GPS sensor and used in conjunction with the Collins GPS Coverage Prediction Program listed above.

NOTE

This does not constitute an operational approval.

NORTH ATLANTIC (NAT) MINIMUM NAVIGATIONAL PERFORMANCE SPECIFICATIONS (MNPS) AIRSPACE

In accordance with the criteria of AC 91-49 and AC 20-138A, two FMS systems must be operating and receiving usable signals from two operating Collins GPS sensors and used in conjunction with a Pre-Departure GPS Coverage Predictor Program such as the Rockwell Collins, CPN 523-0778332-006117, Rev —, or later revision.

NOTE

This does not constitute an operational approval.

RNP-1

The FMS is capable of operations on RNP-1 Departure Procedures and STARS within the U.S. Airspace in accordance with the criteria of FAA AC 90-105, provided that:

1. The FMS is receiving usable signals from a single GPS.
2. The following messages are not displayed on any PFD or CDU:
   - FMS DR
   - VOR/DME ONLY or V/D ONLY
   - VOR/DME DIST > 40 NM

   And for procedures that require GPS or GPS is the only sensor available:
   - GNSS NOT AVAILABLE
   - GNSS-FMS DISAGREE
   - LOSS OF INTEGRITY
3. The crew has entered NOTAM'd navaids on the CDU VOR/DME CONTROL page.
4. The operator/pilot has confirmed that a Type 2 Letter of Authorization is valid for the navigation database. This is available from Rockwell Collins, Inc. by accessing the following website: www.rockwellcollins.com/fms.

NOTE

The following condition only applies when WAAS is NOTAM'd as not available or the airplane is outside the WAAS coverage area and the procedure requires GPS or GPS is the only available sensor.

5. The confirmation of the availability of receiver autonomous integrity monitoring (RAIM) for the intended flight (route and time) should be confirmed using all available information. Dispatch should not be made in the event of predicted continuous loss of RAIM of more than 5 minutes for any part of the intended flight. Predictions may be performed using the following tools:
   a. Collins Pre-Departure GPS Coverage Predictor Program, CPN 832-3443-008, Rev —, or later version.
   b. The FAA website www.raimprediction.net

RNP-5

The FMS is capable of operations on designated RNP-5 routes in Amman, Beirut, Cairo, Damascus and Tel Aviv FIRs, in accordance with the criteria of ICAO Doc 7030/5 Amendment No. 2, 25 August 2009, provided all of the following are true:

1. The FMS is receiving usable signals from at least:
   • One or more DME receivers with VOR/DME auto-tune selected.

   OR

   • One or more GPS receivers.
2. None of the following messages are displayed on any PFD:
   • LOI
   • FMS DR
   • IRS ONLY
   • V/D ONLY
3. None of the following messages are displayed on any CDU:
   • LOSS OF INTEGRITY
   • FMS DR
   • IRS ONLY
   • VOR/DME ONLY
   • VOR/DME DIST > 40 NM
   • GNSS NOT AVAILABLE while operating on a route that requires GPS
4. The crew has entered NOTAM'd navaids on the CDU VOR/DME CONTROL page.
5. It is assumed that the operator will be operating within full scale CDI deflection when the intended operation is to operate on the RNP-5 route.

NOTE

The following condition only applies when the airplane procedure requires GPS or GPS is the only available sensor.

6. The availability of receiver autonomous integrity monitoring (RAIM) for the intended flight (route and time) has been confirmed using all available information. Dispatch should not be made in the event of predicted continuous loss of RAIM (fault detection) of more than 5 minutes for any part of the intended flight. Predictions may be performed using the following tools:
    - Collins Pre-Departure GPS Coverage Predictor Program, CPN 832-3443-008, Rev —, or later version.

RNP-10 AIRSPACE

In accordance with the criteria of FAA Order 8400.12A without time limitations, the FMS meets the minimum requirements for Required Navigation Performance-10 (RNP-10). Two FMS systems must be operating and receiving usable signals from two operating Collins GPS sensors and used in conjunction with a Pre-Departure GPS Coverage Predictor Program such as the Rockwell Collins, CPN 523-0778332-006117, Rev —, or later version.

NOTE

This does not constitute an operational approval.

P-RNAV

In accordance with the criteria of JAA TGL-10 and AC 90-96A, the FMS is capable of P-RNAV operations provided the FMS is not in Dead Reckoning (“FMS DR” displayed on the PFD, MFD, or CDU) and is receiving usable signals from one or more of the following:

- One GPS.
- Multiple DMEs.
- A single DME with auto-tune selected.

Determine the requirements of the national, area, or local air traffic control agency for determining the availability of GPS RAIM for the intended route of flight prior to departure. Some terminal areas may require dual, operating FMS and GPS equipment.

The operator/pilot must confirm that a Type 2 Letter of Authorization is valid for the navigation database. This is available from Rockwell Collins, Inc. by accessing the following website: www.rockwellcollins.com/fms.

NOTE

This does not constitute an operational approval.

NOTE

P-RNAV and B-RNAV operations utilizing GPS as the only NAV sensor requires the following pre-flight planning:

During the pre-flight planning phase, the crew must confirm, for the intended flight (route and time), the availability of receiver autonomous integrity monitoring (RAIM) with the latest information from the U.S. Coast Guard giving details of satellite non-availability (see www.navcen.uscg.gov). The U.S. Notices to Airmen (NOTAM) Office also provides satellite non-availability data.

The confirmation of the availability of RAIM should be obtained from a Pre-Departure GPS Coverage Predictor Program such as the Rockwell Collins, CPN 523-0778332-006117, Rev —, or later version. Dispatch should not be made in the event of predicted continuous loss of RAIM of more than 5 minutes for any part of the intended flight. The use of the EURO CONTROL AUGUR tool may be used to satisfy this requirement. See augur.ecacnav.com/.

ENROUTE AND TERMINAL, INCLUDING B-RNAV

In accordance with AC 90-45A, AC 90-96A, AMC 20-4, and AMC 20-5, the FMS is capable of enroute and terminal operations, including B-RNAV, provided the FMS is receiving usable signals from one or more of the following:

- VOR/DME with auto-tune selected or multiple DMEs.
- One GPS.
- A single DME with auto-tune selected.

NOTE

The FMS must not be in Dead Reckoning (FMS DR displayed on the PFD, MFD or CDU).

NOTE

This does not constitute an operational approval.

NON-PRECISION APPROACH

RNAV (GPS) or GPS Overlay Non-Precision Approach – In accordance with AC 20-130A, AC 20-138A, and AC 90-105, the FMS must be receiving usable signals from at least one GPS sensor, and the LPV APPR, L/V APPR, or GPS APPR annunciation must be displayed at the final approach fix.

VOR/DME Approach (non-GPS overlay) – In accordance with TSO C115B and AC 20-130A, the FMS must be receiving the approach reference VOR/DME station, GNSS sensors disabled and the APPR annunciation must be displayed at the final approach fix.

VOR, TCN, NDB (non-GPS overlay) – The FMS is not authorized to provide guidance for an approach that does not have a GPS overlay. In the terminal area, NO APPR will be annunciated in white on the PFD and APPR FOR REF ONLY in white on the CDU. Depending on database coding, the FMS may provide approach guidance (APPR) for some VOR approaches based on a VOR/DME or VORTAC.

NOTE

Some approaches are not included in the database.

US RNAV/SIDS/STARS

The FMS is capable of operations on U.S. Area Navigation routes, RNAV 1 and RNAV 2, SIDS and STARS in accordance with the criteria of FAA AC 90-100A, provided that:

1. The FMS is receiving usable signals from the DME and IRS, or GPS.
2. The following messages are NOT DISPLAYED on any PFD or CDU:
   a. FMS DR
   b. IRS ONLY
   c. VOR/DME ONLY or V/D ONLY
   d. VOR/DME DIST > 40 NM
3. For procedures requiring GPS or GPS is the only sensor available, the following messages are NOT DISPLAYED on any PFD or CDU:
   a. NO GNSS RAIM
   b. GNSS NOT AVAILABLE
   c. GNSS-FMS DISAGREE
   d. LOSS OF INTEGRITY
4. The crew has entered NOTAM'd navaids on the CDU VOR/DME CONTROL page.
5. The operator/pilot has confirmed that a Type 2 Letter of Authorization is valid for the navigation database. This is available from Rockwell Collins, Inc. by accessing the following website: www.rockwellcollins.com/fms.

NOTE

The following condition only applies when WAAS is NOTAM'd as not available or the airplane is outside the WAAS coverage area and the procedure requires GPS or GPS is the only available sensor.

6. The confirmation of the availability of RAIM should be obtained from the Collins Pre-Departure GPS Coverage Predictor Program, CPN 832-3443-008, Rev —, or later version. The FAA website www.raimprediction.net may also be used.

RNAV APPROACH WITH BAROMETRIC VNAV

The FMS VNAV system is capable of BARO-VNAV operations down to LNAV/VNAV DA minima in accordance with FAA AC 90-105. The FMS must be receiving usable signals from at least one GPS sensor, and the GPS APPR annunciation must be displayed at the final approach fix. A current altimeter setting for the landing airport is required. Where remote altimeter minima are shown, the VNAV function may be used only to the published MDA.

In accordance with FAA AC 20-129, the VNAV system is approved for en route, terminal, and approach operations.

SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

ACT . . . . . Active
ACT FPLN . . . . . Active Flight Plan
AFD . . . . . Adaptive Flight Display
APT . . . . . Airport
BOC . . . . . Bottom of Climb
CRS . . . . . Course
DCP . . . . . Display Control Panel
DEL . . . . . Delete
DEST . . . . . Destination
DEV . . . . . Deviation
DIR . . . . . Direct-To
DIST . . . . . Distance
FMS . . . . . Flight Management System
FACF . . . . . Final Approach Course Fix
FAF . . . . . Final Approach Fix
FIR . . . . . Flight Information Region
FPLN . . . . . Flight Plan
FPTA . . . . . Flight Plan Target Altitude
GNSS . . . . . Global Navigation Satellite System
GPS . . . . . Global Positioning System
GS . . . . . Glideslope
HAL . . . . . Horizontal Alert Limit
HPL . . . . . Horizontal Precision Lateral
IAF . . . . . Initial Approach Fix
INBD CRS . . . . . Inbound Course
INTC CRS . . . . . Intercept Course
LDA . . . . . Localizer Directional Aid
LP . . . . . Lateral Precision
LPV . . . . . Lateral Precision with Vertical Guidance
LSK . . . . . Line Select Keys
MFD . . . . . Multifunction Display
NAV . . . . . Navigation
NPA . . . . . Non Precision Approach
OFST . . . . . Offset
ORIG . . . . . Origin

PA . . . . . Precision Approach
PERF INIT . . . . . Performance Initialization
PFD . . . . . Primary Flight Display
POS INIT . . . . . Position Initialization
PPOS . . . . . Present Position
SBAS . . . . . Satellite Based Augmentation System
SEC FPLN . . . . . Secondary Flight Plan
SEL APT . . . . . Select Airport
SID . . . . . Standard Instrument Departure
SLOP . . . . . Strategic Lateral Offset Procedures
SP RNG . . . . . Specific Range
SP RNG GS . . . . . Specific Range Groundspeed
SP RNG TAS . . . . . Specific Range True Airspeed
SPD/ALT LIMIT . . . . . Speed/Altitude Limit
STAR . . . . . Standard Terminal Arrival Route
TAE . . . . . Track Angle Error
TOD . . . . . Top of Descent
TRANS . . . . . Transition
VAL . . . . . Vertical Altitude Limit
VECT . . . . . Vectored
VNAV . . . . . Vertical Navigation
VPA . . . . . Vertical Path Angle
WAAS . . . . . Wide Area Augmentation System
WPT . . . . . Waypoint
XTD . . . . . Cross Track Distance
XTK . . . . . Cross Track

SECTION 2 - LIMITATIONS

AVIONICS LIMITS

GENERAL

1. The following guides must be immediately available to the pilot at all times:
   - Operator's Guide, FMS-3000 v4.0 Flight Management System for King Air Series Aircraft. Publication Number 523-0816977-002117, 2nd edition, dated 06 February 2009 or later.

FLIGHT MANAGEMENT SYSTEM (FMS)

GENERAL

1. IFR en route and terminal navigation is prohibited unless the pilot verifies either the currency of the database or the accuracy of each selected waypoint and NAVAID by reference to current approved data.
2. If the Satellite Based Augmentation System is not available or disabled, the airplane must have additional navigation equipment appropriate to the intended route, and it must be operational.
3. The WGS-84 or NAD-83 coordinate reference datum in accordance with the criteria of AC 20-130A, AC 91-49 Change 1, and AC 20-138A must be used. Satellite navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States.
4. The FMS is authorized for SBAS operations with WAAS only.
5. The FMS position must be checked for accuracy prior to use as a means of navigation.
6. The FMS must not be used for navigation unless it is receiving suitable navigation information from one or more of the following:
   - One VOR/DME with auto tune selected or multiple DMEs.
   - One GPS.
7. The system program displayed on the STATUS page of the FMS must be:
   - SCID 832-4120-064 with Search and Rescue

   OR
   - SCID 832-4120-063 without Search and Rescue
8. During oceanic, en route and terminal area operation with the FMS DR annunciator illuminated, the flight crew must verify the FMS position using VOR/DME raw data or other appropriate means.
9. All FMS navigation operations are approved within the U.S. National Airspace System and latitudes bounded by 60° North latitude and 60° South latitude at any longitude, with AHC attitude and heading reference system.
   - Operation to 70° North latitude is acceptable east of 75° West longitude and west of 120° West longitude.
   - Operation to 80° North latitude is acceptable east of 50° West longitude and west of 70° East longitude.
   - Operation to 70° South latitude is acceptable except for the 45° between 120° East and 165° East longitude.
10. Fuel management parameters are advisory only and do not replace the primary fuel quantity indications.
11. RNP operations are not authorized, except as noted in Navigation Operational Capabilities.
12. The FMS is not approved for primary means of navigation in the DR mode.

13. The display of Geometric Altitude, GNSS HT or GNSS ALT, shall not be referenced for compliance with published or controller-issued altitudes.
14. The following limitations apply at any time on ground or in flight if FMS software version FMS 3.3.1, 4.0 or 4.0 with SAR (Software Configuration Index Drawing (SCID) 832-4120-037 or 832-4120-063 or 832-4120-064) is installed:

    a. Editing altitudes on FMS CONTROL Display Unit (CDU) ACT/MOD/SEC LEGS on departure procedures and missed approach procedures is prohibited at all times for all ground and flight operations.

    b. If temperature compensation is required:

        1) Any use of automatic FMS Temperature Compensation Feature is prohibited for all ground and flight operations. A separate action is required to disable the FMS Temperature Compensation Feature in the installation.

        2) LNAV/VNAV operations must be accomplished using procedures for uncompensated Baro-VNAV systems. If reported airport temperature is outside published limits for the approach, Baro-VNAV operation is permitted only to the LNAV or circling line of minima, as applicable.

        3) Temperature compensation may be accomplished manually without using the FMS by entering temperature-corrected altitudes on the altitude preselect on the Flight Guidance Panel and/or using basic altimetry techniques.

    c. The barometric altimeter(s) shall be referenced to assure compliance with altitude restrictions for all flight operations, including departure, any approach and missed approach segment, step down fix and “climb to” restrictions.

NOTE

Step down fixes may not be available in the navigation database for certain approaches and approach segments.

VERTICAL NAVIGATION

1. When using FMS VNAV, the barometric altimeters must be used as the primary altitude reference for all operations.
2. Use of VNAV guidance for a V-MDA approach that includes a step-down fix between the final approach fix and missed approach point is prohibited.
3. VNAV altitudes must be displayed on the MFD map page or CDU legs page when utilizing VNAV for flight guidance.
4. Use of VNAV while conducting a missed approach procedure is prohibited.
5. Provided the FMS is receiving adequate usable sensor inputs, it has been demonstrated capable of and has been shown to meet the accuracy specifications of VNAV operation in accordance with AC 20-129.

6. RNAV (GPS) Approaches - The Collins FMS-3000 meets the requirements of AC 20-130A for GPS based RNAV approaches. This includes RNAV approaches labeled as RNAV (GPS), provided GPS sensor data is valid.
7. BARO-VNAV approach guidance to a DA is not authorized if the reported surface temperature exceeds the Baro-VNAV temperature limitations specified on the applicable approach procedure chart. LPV and L/V approaches are not subject to temperature restrictions.

NOTE

Barometric VNAV guidance during approach including the approach transition, final approach segment and the missed approach procedure is not temperature compensated. Operating at uncompensated minimum IFR altitudes will not provide expected terrain and obstacle clearance for temperature below ISA.

APPROACH

1. FMS instrument approaches must be accomplished in accordance with approved instrument approach procedures that are retrieved from the FMS navigation database. The FMS database must incorporate the current update cycle.
2. The FMS with inputs from the GPS may only be used for approach guidance if the reference coordinate data system for the instrument approach is WGS-84 or NAD-83.
3. Use of barometric VNAV Decision Altitude (DA) is not authorized with a remote altimeter setting. A current altimeter setting for the landing airport is required. Where remote altimeter minima are shown, the VNAV function may be used only to the published MDA.

4. ILS, LOC, LOC-BC, LDA and SDF approaches using the FMS for approach guidance are prohibited. If an ILS, LOC-BC, LDA or SDF approach is loaded from the database, the pilot must ensure that the active NAV source transitions from FMS to short range NAV prior to the FAF.
5. When the approach at the destination is based on GPS guidance and the Satellite Based Augmentation System (SBAS) is not available or disabled, an alternate airport required by operating rules must be served by an approach based on other than GNSS navigation. The airplane must have operational equipment capable of using that navigation aid, and the required navigation aid must be operational.
6. IFR non-precision approach approval is limited to published approaches within the U.S. National Airspace System. Approaches to airports in other airspace are not approved unless authorized by the appropriate governing authority.
7. Inserting waypoints on a published approach is prohibited.
8. Approaches copied from the SEC FLPN must be re-entered if previously flown.
9. An FMS APPR (green), GPS APPR (green), LPV APPR (green) or L/V APPR (green) annunciator in the PFD must be illuminated at the FAF in order to conduct the instrument approach procedure. Use of FMS guidance for conducting instrument approach procedures is prohibited with the FMS annunciation NO APPR illuminated.
10. The use of manually inserted runway coordinates of FMS Visual Approaches is limited to VFR operations only.
11. Use of FMS to capture and track a DME arc outside the published end points is prohibited.

NOTE

Not all published approaches are in the FMS database. The flight crew must ensure that the planned approach is in the database.

SECTION 3 - EMERGENCY PROCEDURES

No change.

AVIONICS

FMS CAUTION MESSAGES

The yellow MSG displayed on each PFD indicates presence of an FMS message on the CDU that requires pilot awareness and may require pilot action. Refer to the Collins FMS-3000 Flight Management System Pilot's Operating Manual, under Messages and Annunciations, Section 11.

APPR NOT AVAILABLE (CDU MFD)

This message is displayed in the terminal area (31 nm from the origin or destination) when the FMS determines the system does not meet the navigational requirements for approach operations.

- Select an approach not based on GNSS or proceed to the alternate airport if an approach cannot be completed in visual conditions.

CHK SBAS SVC PRVDR (CDU)

This message is displayed when Satellite Based Augmentation System is not available or is not enabled.

- Verify the SBAS provider is enabled.

CRS TO FAF > 45 DEG (CDU)

This message is displayed after executing a direct-to the FAF with an INTC CRS greater than 45 degrees from the final approach course. The FMS will not transition to the approach mode and SEQ INHB will be displayed on the PFD in yellow. If the approach is flown with this message displayed, the FMS will not provide guidance beyond the FAF to track the final approach course.

- Perform a direct-to the FAF with an INTC CRS within 45 degrees of the final approach course.

HALF BANK SELECTED (CDU)

This message is displayed when the autopilot/flight director 1/2 BANK and NAV modes are active, an approach is in the flight plan and the airplane is within 31 nm of the approach airport. The message is also displayed within 1 minute of entering a holding pattern.

- Deselect 1/2 BANK mode prior to commencing the approach or entering a holding pattern.

GNSS NOT AVAILABLE (CDU)

This message is displayed when the FMS cannot use any of the enabled GNSS sensors or the crew has disabled all GNSS sensors via the GNSS CTL page.

- Continue FMS navigation with remaining valid sensors appropriate for the route of flight.

LOI (PFD) AND LOSS OF INTEGRITY (CDU MFD)

This message is displayed when the FMS detects that the GNSS position does not meet the requirements for navigational use in the current phase of flight.

• Select a navigation source other than FMS.

OR

• Deselect the GNSS receivers and continue FMS navigation with remaining valid sensors in accordance with airspace requirements.

NO APPR (PFD)

This message is displayed when the FMS is in approach mode and the FMS determines the system does not meet the navigational requirements for approach operations.

• Execute a go-around if the approach cannot be completed in visual conditions.

USE LNAV MINIMUM (CDU MFD)

This message is displayed when the GNSS vertical signal is inadequate for operating to the LPV or SBAS L/V minimums. This message will be accompanied with the LPV NOT AVAILABLE or L/V NOT AVAILABLE message.

• Select BARO via the ARR DATA page and fly the approach utilizing BARO VNAV to LNAV/VNAV minimums or LNAV minimums. The selection of BARO must be executed prior to the FAF.

SECTION 4 - NORMAL PROCEDURES

AVIONICS

FMS MESSAGE

The white MSG displayed on each PFD indicates presence of an FMS white message that requires pilot awareness and may require pilot action. Refer to the Collins FMS-3000 Flight Management System Pilot's Operating Manual, under Messages and Annunciations Section 11.

MFD FMS map source data is controlled by the menu button on the CCP, when a map is displayed on the MFD.

The EFIS transition altitude FL alert caution setting is controlled from the FMS VNAV setup page.

FMS APPROACH PROCEDURE WITH BARO-VNAV

CAUTION

Use of the autopilot/flight director 1/2 BANK mode may result in excessive deviation from the course during an approach or holding pattern due to the limits these modes place on autopilot command authority.

1. On the CDU, press the DEP ARR function key to show the ARRIVAL page.

NOTE

Either an origin (ORIG) or a destination (DEST) airport must be specified in the flight plan for approach selections to be available on the ARRIVAL page. When the DEP ARR key is pressed, one of three pages is shown: DEPART, ARRIVAL, or DEP/ARR INDEX. If the airplane is on the ground, or airborne less than 50 nm from the origin airport, or less than halfway to the destination airport, the DEPART page for the ORIGIN airport shows. If the airplane is airborne and more than halfway to the destination airport, the ARRIVAL page for the destination airport is shown.

2. Press the line select button adjacent to the desired approach.
3. Press the line select key button adjacent to the desired transition.

NOTE

If the desired approach or transition is not visible under the APPROACHES or TRANS list, press the NEXT or PREV function keys to scroll through additional selections.

4. Via the ARR DATA page, select BARO if the approach is a LPV or L/V as set by the database.
5. Once the approach, approach transition and BARO (if required) have been selected, press the EXEC function key to add the approach to the flight plan.

NOTE

When an approach is added to a flight plan from the ARRIVAL page, a discontinuity may be added immediately before the approach procedure in the flight plan.

6. To intercept the final approach course via vectors, select the flight director NAV or APPR mode. When flying an approach via a transition other than vectors and APPR is the desired vertical mode to complete the approach, verify APPR mode is selected prior to 2 nm from the final approach fix.
7. If VNAV path guidance is desired for a non-precision approach, select VNAV mode prior to the final approach fix. The FMS will provide a vertical path for those approaches with a vertical angle displayed on the CDU LEGS page to the altitude at the runway or missed approach point.

Approaches without a vertical angle will display V-MDA above the missed approach point altitude on the CDU LEGS page. If APPR mode is selected on the FCP, a white GP annunciation will be displayed no later than 2 nm from the final approach fix. This indicates the system is armed to capture and track a VNAV glidepath past the final approach fix. After glidepath capture, the annunciation will change to VGP in green. In VGP mode, the VNAV system will not level at the preselected altitude. The preselector can be set to the missed approach altitude. Operation in VGP mode is similar to GS mode for an ILS approach and is appropriate when operating to a DA. If NAV mode is selected on the FCP, a white PATH annunciation will be displayed no later than 2 nm from the final approach fix. This indicates the system is armed to capture and track a VNAV path past the final approach fix. After path capture, the annunciation will change to VPATH in green. In VPATH mode, the VNAV system will level at the preselected altitude or VNAV reference altitude whichever is higher. There may be subsequent step-down fixes after the FAF that require pilot action to continue the descent to the MDA.

VNAV path guidance after the FAF is not available for those approaches with V-MDA displayed above the missed approach point altitude on the CDU. If flying level to the FAF, the airplane will remain in an altitude hold mode past the FAF unless another flight director vertical mode is selected for descent to the desired MDA. If descending to the FAF via a VNAV defined path the flight director will revert to PTCH mode at the FAF and the airplane will continue the descent at the airplane pitch value present at the transition to PTCH mode. There may be subsequent step-down fixes after the FAF that require pilot action to continue the descent to the MDA.

FMS LPV OR L/V APPROACH PROCEDURE

CAUTION

Use of the autopilot/flight director 1/2 BANK mode may result in excessive deviation from the course during an approach or holding pattern due to the limits these modes place on autopilot command authority.

1. On the CDU, press the DEP ARR function key to show the ARRIVAL page.

NOTE

Either an origin (ORIG) or a destination (DEST) airport must be specified in the flight plan for approach selections to be available on the ARRIVAL page. When the DEP ARR key is pressed, one of three pages is shown: DEPART, ARRIVAL, or DEP/ARR INDEX. If the airplane is on the ground, or airborne less than 50 nm from the origin airport, or less than halfway to the destination airport, the DEPART page for the ORIGIN airport shows. If the airplane is airborne and more than halfway to the destination airport, the ARRIVAL page for the destination airport is shown.

2. Select an RNAV (GNSS) approach that is authorized for SBAS-VNAV.
3. Press the line select button adjacent to the desired transition.

NOTE

If the desired approach or transition is not visible under the APPROACHES or TRANS list, press the NEXT or PREV function keys to scroll through additional selections.

4. Once the approach and transition have been selected, press the EXEC function key to add the approach to the flight plan. The FMS annunciates “LPV TERM” or “L/V TERM” on the PFD when the airplane is within the terminal area (31 nm) of the selected facility.

NOTE

When an approach is added to a flight plan from the ARRIVAL page, a discontinuity may be added immediately before the approach procedure in the flight plan.

5. To intercept the final approach course via vectors, select the flight director APPR mode. When flying an approach via a transition other than vectors, verify APPR mode is selected prior to 2 nm from the final approach fix.

NOTE

Approaches conducted utilizing SBAS-VNAV are not subject to temperature limitations.

6. Select VNAV mode prior to the final approach fix (FAF). RWY is annunciated on the PFD when within 500 ft (approximately 2 dots) of the LPV vertical path. If APPR mode is selected on the FGP, a white GP annunciation will be displayed no later than 2 nm from the final approach fix. This indicates the system is armed to capture and track a glidepath past the final approach fix. After glidepath capture, the annunciation will change to VGP in green. In VGP mode, the VNAV system will not level at the preselected altitude. The preselector can be set to the missed approach altitude. Operation in VGP mode is similar to GS mode for an ILS approach and is appropriate for operations to a DA.
7. When the flight plan leg after the FACF becomes active and the airplane meets the lateral capture criteria, the PFD annunciates LPV APPR or L/V APPR and displays angular lateral and vertical deviation for the SBAS-VNAV approach. RWY will be annunciated on the PFD in the VNAV target altitude field after LPV or L/V APPR is annunciated and the airplane is within 500 ft of the SBAS vertical path.

NOTE

The TOD displayed past the FACF is based on a barometric VNAV path to the final approach fix altitude until the FMS transitions to LPV APPR or L/V APPR mode. After transition to either FMS approach mode, the TOD represents the intercept point of the SBAS vertical path.

8. The FMS transitions to LPV APPR or L/V APPR mode under any of the following conditions:
   a. The FACF is sequenced and flying on the published procedure.
   b. Intercepting inside the FACF via HDG mode and within 0.2 nm of the lateral path.
   c. If a direct-to the FAF was selected with an INTC course within 45 degrees of the final approach course, LPV APPR or L/V APPR will be annunciated 2 nm prior to the FAF.
   d. If a vertical direct-to to FAF was selected, LPV APPR or L/V APPR will be annunciated 2 nm prior to FAF.
   e. If the FACF is deleted, LPV APPR or L/V APPR will be annunciated after sequencing the next step down fix or in absence of any step down fixes 2 nm prior to the FAF. If the last step down altitude is less than 2 nm from the FAF, either FMS approach mode activates 2 nm prior to the FAF.
   f. If step down altitudes between the FACF and FAF have been modified with an AT constraint altitude, LPV APPR or L/V APPR will activate after the last modified step down altitude. If the last step down altitude is less than 2 nm from the FAF, either FMS approach mode activates 2 nm prior to the FAF.

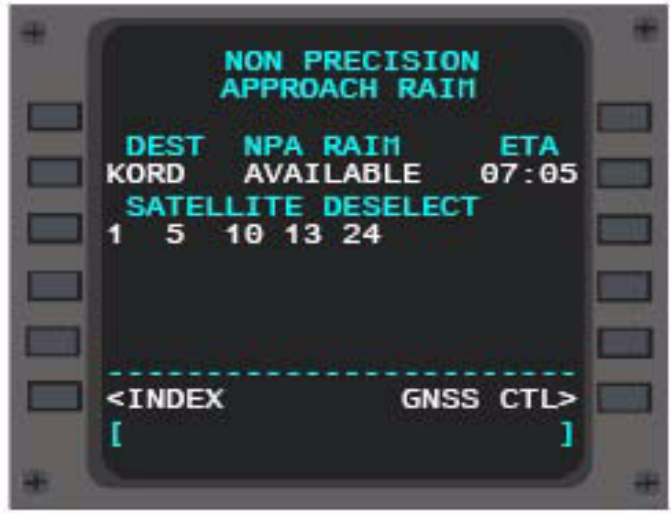
g. When flying parallel to the final approach course in heading mode, LPV APPR or L/V APPR will activate crossing the 2 nm radius circle around the FAF.

MISSED APPROACH PROCEDURE

Missed approach procedures are automatically added to the flight plan with the selection of an approach. The missed approach procedure begins on the LEGS page with the leg immediately following the MISSED APPR label. It will also display on the ACT/MOD FPLN page as MISSED APPROACH. A missed approach is activated by pressing the GA button.

1. If a missed approach is required from a localizer based approach:
   a. Select the GA button to initiate the go-around and missed approach procedure.
   b. Set power, configure, and climb on course as required.
   c. On the LEGS page, verify AUTO sequence is selected.
   d. Select FMS as the active NAV source.
   e. Set the appropriate lateral and vertical flight director modes.
   f. Engage the autopilot (if desired).
2. If a missed approach is required from an FMS based approach:
   a. Select the GA button to initiate the go-around and missed approach procedure.
   b. Set power, configure, and climb on course as required.
   c. On the LEGS page, verify AUTO sequence is selected.
   d. Set the appropriate lateral and vertical flight director modes.
   e. Engage the autopilot (if desired).

NON-PRECISION APPROACH RAIM PAGE



This function is only required when conducting a GPS based approach outside of WAAS coverage or when WAAS is NOTAM'd as unavailable. Verification of Non Precision Approach RAIM availability is not required when conducting SBAS based approaches.

FMS NAV-TO-NAV OPERATION

1. FMS NAV-to-NAV operation did not change as a result of this installation. The following explanation provides additional information for the white "NO APPR" message on the PFD.
2. The white "NO APPR" message is displayed on the PFD within 31 nm of the destination airport and a localizer based approach is in the flight plan when a condition exists that will inhibit the automatic transition from FMS to LOC navigation source. These conditions include:
   a. The NO APPR indication is displayed on the PFD when APPR is selected more than 31 nm from the airport. When within the 31 nm radius of the airport, selecting NAV and then APPR will clear the NO APPR indication.
   b. The NO APPR indication is displayed on the PFD when the localizer is not tuned to the proper frequency.

3. The crew must select APPR (on the Flight Guidance Panel) after the FMS completes the NAV-to-NAV set-up for the automatic transition from FMS to LOC navigation to occur. The crew can confirm that the FMS has completed the NAV-to-NAV set-up for the selected approach by observing the following on the PFD displays when the airplane is in the terminal area:
   a. Localizer is tuned to the ILS frequency corresponding to the selected approach.
   b. Localizer course is set.
   c. LOC is the preselected navigation source.

SECTION 5 - PERFORMANCE

No change.

SECTION 6 - WEIGHT & BALANCE/EQUIPMENT LIST

No change.

SECTION 7 - SYSTEMS DESCRIPTION

No change.

SECTION 8 - HANDLING, SERVICING & MAINTENANCE

No change.