

MK V EGPWS changes from software –104-104 to software –234-234

NOTE: This list does NOT include Air Transport or Military changes

965-0976-003-104-104 to 965-0976-003-105-105 – Service Bulletin 012-0687-108 (965-0976-0xx-34-08)

965-0976-040-104-104 to 965-0976-040-105-105 – Service Bulletin 012-0687-109 (965-0976-0xx-34-09)

- Added support for the following aircraft:
 - Lear 45 with no display, AHRS attitude source (aircraft type 102)
 - Lear 60 with no display, AHRS attitude source (aircraft type 78)
- Changed support for the following existing aircraft types:
 - Astra SPX (aircraft type 90) updated various interface signal requirements and added nonintegrated display capability
 - Challenger CL601-3A/3R (aircraft types 81 and 85) updated Honeywell display interface to improve display pattern and improve range change handling
 - Citation Excel aircraft type (103 and 167) updated per the final Cessna/Honeywell/AlliedSignal definition
 - Falcon 50EX (aircraft type 126) updated nonintegrated display interface to correctly position “TERR” mode annunciation.
 - Falcon 900EX (aircraft type 93) updated per the final Dassault/Honeywell/AlliedSignal definition
 - Falcon 900/900B (aircraft type 75) updated Honeywell display interface to improve display pattern and improve range change handling
 - Falcon 2000 (aircraft type 125) updated nonintegrated display interface to correctly position “TERR” mode annunciation.
 - Global Express (aircraft type 97) updated per the latest Honeywell/AlliedSignal definition, but not the final definition.
 - Hawker 800 (aircraft types 66 and 138) updated Honeywell display interface to improve display pattern and improve range change handling
 - Hawker 1000 (aircraft type 67) updated Honeywell display interface to improve display pattern and improve range change handling
- Changed the Audio BIT test to reduce the audible affect during EGPWS power up.
- Made display prioritization match the most recent FAA/Industry definition:
 1. Terrain Warning
 2. PWS Warning
 3. Terrain Caution
 4. PWS Caution
 5. PWS Advisory
 6. Terrain Background Display

965-0976-003-105-105 to 965-0976-003-202-202 – Service Bulletin 012-0687-114 (965-0976-0xx-34-14)

965-0976-040-105-105 to 965-0976-040-202-202 – Service Bulletin 012-0687-112 (965-0976-0xx-34-12)

965-0976-0xx-202 Mod 1-202 to 965-0976-0xx-202 Mod 2-202 Mod 1– Service Bulletin 012-0687-142 (965-0976-0xx-34-42)

- Added support for the following aircraft:
Embraer 145 with fully integrated Primus 1000 display (aircraft type 033)
- Changed support for the following existing aircraft types:
Challenger CL604 (aircraft type 039) added Nonintegrated Collins ProLine 4 display capability
Falcon 20F (aircraft type 070) added Nonintegrated Collins ProLine 2 display capability
Falcon 20F (aircraft type 071) added Nonintegrated Collins ProLine 2 display capability and FMS Nav Mode input requirement
Falcon 50 (aircraft type 082) added Nonintegrated Collins Pro Line 2 display capability, deleted Mag Track input from high and low speed FMS buses
Falcon 50EX (aircraft type 092) updated per final Dassault/Collins/AlliedSignal definition
Falcon 2000 (aircraft type 091) updated per final Dassault/Collins/AlliedSignal definition
Global Express (aircraft type 097) updated per final Honeywell/AlliedSignal definition
Lear 45 (aircraft type 102) updated to use ARINC 429 label 221 for Angle of Attack, instead of labels 222 and 223
Lear 60 (aircraft type 078) added Nonintegrated Collins ProLine 4 display capability and dual low speed FMS buses with FMS Nav Mode word, changed dual high speed FMS buses to optional
- Revised the Terrain Awareness takeoff approach guard to inhibit Terrain Awareness Alerts below 30 feet AGL if radio altitude data is valid
- Changed position accuracy requirements to a system that assigns a required position accuracy value for each phase of flight. The old system assigned a required position accuracy value based on terrain database resolution
- Revised Hard Glideslope message from continuous `Glideslope' voices to `Glideslope, Glideslope – 3 second pause - Glideslope, Glideslope, - 3 second pause...' voices. This allows interleaving of other lower priority alerts
- Adjusted audio output to normalize all voices for a consistent volume level, one that matches the volume level of the MK V GPWS voices. This resulted in an approximate 4dB to 6dB increase in volume for some voices
- Re-recorded the following voices to fine-tune relative volume, inflection, clarity, and overall quality: `Invalid', `Altitude', `429', `Glideslope', `Bank Angle', `Caution Terrain', `V1', all numerical voices (e.g. `1', `2',...), all Altitude Callouts
- Added Alternate Audio (Voice) Menu # 6
- Revised Altitude Callout Menu # 86 to change `Minimums' to `Minimum'.
- Added Altitude Callout Menu # 97: Plus Hundred, Minimums, 2500, 1000, 500, 100, 50, 40, 30, 20, 10
- Added Altitude Callout Menu # 91: Minimums, 1000, 500, 100, 50, 40, 30, 20, 10
- Added Altitude Callout Menu # 92: Plus Hundred, Minimums, 60, 30, 10
- Added Altitude Callout Menu # 93: Radio Altimeter (female), 1000, 100, 50, 30, 20, 10
- Added Altitude Callout Menu # 94: Above (female), Decide (female), Radio Altimeter(female), 1000, 100, 50, 30, 20, 10
- Added Altitude Callout Menu # 95: Radio Altimeter(female), 1000
- Added Altitude Callout Menu # 96: Plus Hundred, Minimums, 2500, 1000(baro), 500(baro), 100, 50, 40, 30, 20, 10
- Revised Self-Test to inhibit Self-Test activation in the air and delete the `Obstacle' voice in Long Level 1
- Revised Baro Altitude Callout reset logic to match that of the MK V GPWS
- Added capability to configure the Glideslope Cancel ceiling to either 2000 feet AGL or 1000 feet AGL

- Mod 1 to Application Software Version 202 was not applicable to the MK V. It was only applicable to the MK VII.
- Mod 2 to the Application Software Version 202 and Mod 1 to the Configuration Software Version 202 implement the following changes:
 - (1) The advisory task software is responsible for processing mode 6 functions, including altitude callouts. If the advisory task software fails or is suspended, the callout INOP discrete is set TRUE. However, very few aircraft types use the callout INOP discrete, which may result in a mode 6 task failure being unannounced. The configuration database has been updated to set the GPW INOP discrete in addition to the CALLOUT INOP discrete.
 - (2) On some aircraft types, the processor loading exceeds system capabilities. As a result, the look ahead terrain alerting and terrain display functions may be periodically inoperative. Several changes have been implemented in the application software to reduce processor loading.
 - (3) Large terrain databases greater than approximately 32 Mb cause the MAPS task to set a watchdog reset at initialization, rendering the EGPWS inoperative. The Application Software will be changed to reset the watchdog timer and reschedule the keyboard monitor task which will prevent the watchdog reset during initialization.
 - (4) If an operator attempts to install a version of EGPWS software that is older than the currently installed version, the EGPWS will fail upon power up. A change has been made to the PCMCIA card upload file used to load the EGPWS software. The change will permit installing versions of EGPWS software older than the currently installed version.

965-0976-0xx-202-202 to 965-0976-0xx-204-204 – Service Bulletin 012-0687-117 (965-0976-0xx-34-17)

965-0976-0xx-204-204 to 965-0976-0xx-204 Mod 1-204 – Service Bulletin 012-0687-130 (965-0976-0xx-34-30)

965-0976-0xx-204 Mod 1-204 to 965-0976-0xx-204 Mod 2-204 Mod 1– Service Bulletin 012-0687-141 (965-0976-0xx-34-41)

- Added support for the following aircraft:
 - Falcon 50 with fully integrated Collins ProLine IV retrofit display (aircraft type 94)
 - Falcon 20 with fully integrated Collins ProLine IV retrofit display, no windshear (aircraft type 77)
 - Lear 45 with fully integrated Honeywell Primus 1000 display (aircraft type 166)
- Changed support for the following existing aircraft types:
 - Falcon 20 (aircraft type 71) made FMC Nav Mode an optional interface
 - Hawker 800 (aircraft types 65 and 73) added Collins ProLine II display capability
- Added Obstacle alerting capability to all aircraft. Program pin 13 (MP-5B) is used to activate obstacle alerting.
- Added optional FMS Nav Mode capability to most aircraft types
- Added AHRS/IRS bus hunting capability at Astra SPX, Falcon 20, Gulfstream II, Gulfstream IIB/III, Hawker 800 with Teledyne AOA, Hawker 800 with SafeFlight AOA, and Saab 2000 (types 90, 71, 68, 69, 65, 73, and 36, respectively)
- Added TCAS Inhibit discrete to ARINC 429 output label 300.
- Added Altitude Callout menu #39: Approaching Minimums, Minimums, 500, 100, 50, 40, 30, 20, 10.
- Added Altitude Callout menu #98: 50 Above (female voice), Decide (female voice), Radio Altimeter (female voice at 2500 feet), 1000.
- Added Altitude Callout menu #99: Decide (female voice), Radio Altimeter (female voice at 2500 feet), 1000, 100, 50, 30, 20, 10.
- Revise the following voices to improve clarity and emphasis: “Stall”, “Terrain Ahead Pull Up”, and “Terrain Ahead”.
- Revised Self Test (Level 2) and Present Status messages to include identification of Glideslope Inhibit, Terrain Not Available (due to position information being out of tolerance), and all Inop conditions.
- Revise Inop logic to set all Inop indications for a program pin parity error.
- Revised Fault Reporting to remove lack of update fault reporting for GPS Date and GPS Time.
- Revised Position Switching logic for non-IRS installations which use the FMS Nav Mode. The Terrain Not Available condition will occur faster upon loss of GPS and FMS radio updating (transition to dead reckoning).
- Revised Audio On output to activate faster and any time the EGPWS is speaking. Prior implementation did not set the Audio On for altitude callouts.
- Revised “Too Low Terrain” voice logic to ensure that it is not significantly delayed when it coincides with a “1000” food callout.
- Revised 429 output timing to ensure that specified update rate is met.
- Revised Altitude Callout Menu #38 to change “Approaching Decision Height” to “Approaching Minimums” and changed “Decision Height” top “Minimums”.
- Revised Audio Menu #1 to change the Obstacle Caution voice from “Terrain Ahead” to “Obstacle Ahead” and the Obstacle Warning voice from “Terrain Ahead Pull Up” to “Obstacle Ahead Pull Up”.
- Mod 1 to Application Software Version 204 fixes the problem of large terrain databases setting a watchdog reset at initialization, rendering the EGPWS inoperative.
- Mod 2 to the Application Software Version 204 and Mod 1 to the Configuration Software Version 204 implement the following changes:
 - (1) During terrain caution or warning alerts, the display of the terrain threat region may be inaccurately portrayed when the display scale is set at 30 NM or larger.
 - (2) If the advisory task software fails or is suspended, the configuration database will be updated to set the GPWS INOP discrete in addition to the CALLOUT INOP discrete to prevent mode 6 task failure being unannounced.
 - (3) Several changes will be implemented in the application software to reduce processor loading.

965-0976-0xx-204-204 to 965-0976-0xx-206-206 – Service Bulletin 012-0687-121 (965-0976-0xx-34-21)

965-0976-0xx-206-206 to 965-0976-0xx-206 Mod 1-206 Mod 1– Service Bulletin 012-0687-124 (965-0976-0xx-34-24)

965-0976-0xx-206 Mod 1-206 Mod 1 to 965-0976-0xx-206 Mod 2-206 Mod 2– Service Bulletin 012-0687-136 (965-0976-0xx-34-36)

965-0976-0xx-206 Mod 2-206 Mod 2 to 965-0976-0xx-206 Mod 3-206 Mod 2– Service Bulletin 012-0687-170 (965-0976-XXX-34-70)

- Added support for the following aircraft:
 - Beechjet 400A with non-integrated Collins ProLine IV display and Rosemount AOA (aircraft type 162)
 - Bombardier CL604 with integrated Collins ProLine IV display and windshear (aircraft type 40)
 - Dornier 328 Jet with integrated Honeywell Primus 2000 display (aircraft type 35)
 - Gulfstream G-IV/IVSP with integrated Honeywell SPZ-8000/8400 with dual ADC, IRS and Rad Alt (aircraft type 87)
- Changed support for the following existing aircraft types:
 - Falcon 20 (aircraft type 77) updated AOA and flap interface to correct windshear detection
 - Lear 45 (aircraft type 166) updated to support inop is same window and revised polarity of flap position discretes and GS/Loc selection logic
- Add provisions to most aircraft types for optional ARINC 743 GPS (VFOM/HFOM in meters) support. Default support is ARINC 743A (VFOM/HFOM in feet/nautical miles).
- Added Geometric Altitude for all aircraft types. Geometric Altitude uses GPS altitude, Static Air Temperature and Radio Altitude to determine a more accurate altitude above terrain in differing atmospheric conditions. Geometric Altitude requires GPS to be provided direct to the EGPWS, otherwise Corrected Barometric Altitude will be used.
- Updated display parameters for Primus 1000/2000 displays to not display TERR or OBST during and obstacle caution or warning. TERR remains only a mode annunciation indicating terrain is selected for display.
- Increased terrain display brightness for Primus 1000/2000 and SPZ-8000/8400/8500 aircraft.
- Added PEAKS mode support for SPZ-8500 EFIS (in G-V aircraft types 96 and 104).
- Revised display auto ranging and auto pop-up logic to prevent inappropriate auto ranging from occurring on transition from Caution to Warning for Primus 1000/2000 aircraft.
- Improved Terrain Awareness disable logic to prevent the function from being disabled below 30 feet while greater than 1 mile from the runway.
- Updated the Terrain Not Available logic to set the Not Available condition when position input signals are set to No Computed Data (NCD).
- Updated ground speed input reversion logic to prevent reversion to GPS ground speed if GPS is not available.
- Updated the audio volume control to allow for more flexibility in the output volume. A third level of audio volume was added mid-way between the existing high and low volumes.
- Updated position switching logic to allow manual Terrain Awareness inhibiting using GPS, IRS, and FMS inputs where no FMS Nav Mode is available.
- Updated RNP Mode Logic to more accurately select the Terrain Awareness Approach mode using relative altitude and distance from the runway.
- Improved the volume of the software Glideslope callout to be 6db below the loud Glideslope callout.
- Added Callout Menu #100: Plus Hundred, 2500, 1000(baro), 60, 30, 10
- Added Callout Menu #5: Approaching Minimums, Minimums, 2500, 50, 40, 30, 20, 10
- Mod 1 to Application Software Version 206 and Configuration Software Version 206 implements the following change:
 - (1) Beechjet 400A Flap Angle Parameters problem - the 3 flap angle discrete inputs are missing from the aircraft Configuration Database Software. This causes a slight error in the Angle of Attack (AOA) correction. The Configuration Database Software is updated to add the Beechjet 400 flap angle inputs.
- Mod 2 to Application Software Version 206 and Configuration Software Version 206 implement the following changes:
 - (1) During terrain caution or warning alerts, the display of the terrain threat region may be inaccurately portrayed when the display scale is set at 30 NM or larger.

- (2) If the advisory task software fails or is suspended, the configuration database will be updated to set the GPWS INOP discrete in addition to the CALLOUT INOP discrete to prevent mode 6 task failure being unannounced.
- (3) Several changes will be implemented in the application software to reduce processor loading.
- Mod 3 to Application Software Version 206 implements the following change:
 - (1) Honeywell has discovered an EGPWS power up initialization issue when using Envelope Modulation Database B05. To correct this issue, Honeywell is implementing a minor MOD to the Application Software to correct this particular problem and also to prevent future issues with new Envelope Modulation Databases.

965-0976-0xx-206-206 to 965-0976-0xx-208-208 – Service Bulletin 012-0687-127 (965-0976-0xx-34-27)

965-0976-0xx-208-208 to 965-0976-0xx-208 Mod 1-208 Mod 1 – Service Bulletin 012-0687-135 (965-0976-0xx-34-35)

965-0976-0xx-208 Mod 1-208 Mod 1 to 965-0976-0xx-208 Mod 2-208 Mod 1 – Service Bulletin 012-0687-159 (965-0976-0xx-34-59)

965-0976-0xx-208 Mod 2-208 Mod 1 to 965-0976-0xx-208 Mod 3-208 Mod 1– Service Bulletin 012-0687-170 (965-0976-XXX-34-70)

- Added support for the following aircraft:
 - Bombardier RJ 100/200 with non-integrated Collins ProLine IV display (aircraft type 43)
 - DeHavilland Dash 8-400 with no display support (aircraft type 88)
 - Embraer 135 (aircraft type 33). Confirmed to be identical to existing Embraer 145 aircraft type 33
 - IAI Galaxy with non-integrated Collins ProLine IV display (aircraft type 89)
- Changed support for the following existing aircraft types:
 - Beechjet 400A (aircraft type 162) updated windshear parameters, added support for Teledyne AOA and AMS-5000
 - Bombardier CL604 (aircraft type 39 only) updated software to use correct windshear parameters
 - Gulfstream GII/IIB/III (aircraft types 68 and 69) added support for Collins FDS-2000 display
 - Lear 45 (aircraft type 166) updated glideslope interface to use only Normal of Fail/Warn SSM indications.
 - Falcon 2000/50EX/900EX (aircraft types 91, 92, and 93) updated air data validity processing
 - Falcon 2000/50EX/900EX (aircraft types 91/92/93/125/126/157) updated maintenance message failure text
 - Falcon 50/50EX (aircraft types 94/92/126) updated landing flap configuration to include 20 degrees
 - Falcon 2000/50EX/50 (aircraft types 91/92/94) added 90 degree sweep as optional display type
 - Falcon 50 (aircraft type 82) updated interface to include True Track, Ground Speed and IRS/AHRS bus hunting
- Added Internal GPS card support (requires PN 965-0976-02X)
- Improved brightness of terrain display for Collins ProLine 2 and ProLine 4 displays.
- The following changes were made, within the guidelines of TSO-C92c, to reduce potential Mode 2 or 4 nuisance alerts:
 - Eliminating the airspeed expansion of the standard Mode 4 curves when the enhanced terrain clearance floor is active.
 - Limiting the top of the Mode 2 curve when the enhanced function is active and of high integrity.
- Added capability to activate Lamp Format 2 via program pin 12 (TP-5B).
- Added capability to reverse the Alternate Mode 4B function defined for each aircraft type via program pin 9 (MP-2C).
- Added support for alternate displays via program pin 18 (MP-15A).
- Added support for WGS-84 based GPS altitude via program pin 19 (MP-15B).
- Revised aircraft heading logic to derive True Heading from Magnetic Heading and Mag Variation in AHRS aircraft.
- Revised Air Ground logic to better detect on ground condition. This will ensure that EGPWS self tests can be performed on the ground with inaccurate radio altitude input.
- Revised Geometric Altimetry logic to allow geometric altitude to continue operating during failures of GPS and reduced the affect of corrected barometric altitude during QFE operations.
- Revise closest runway selection logic to more accurately select the closest runway when multiple runways are located in close proximity.
- Added Altitude Callout menu #32: 2500, 1000, 500, 100, 50, 40, 30, 20, 10
- Added Altitude Callout menu #35: 2500, 1000(baro), 500(baro), 100, 50, 40, 30, 20, 10
- Added Altitude Callout menu #101: 500 tone, 100, 50, 30, 20
- Mod 1 to Application Software Version 208 and Configuration Software Version 208 implement the following changes:
 - (1) During terrain caution or warning alerts, the display of the terrain threat region may be inaccurately portrayed when the display scale is set at 30 NM or larger.
 - (2) If the advisory task software fails or is suspended, the configuration database will be updated to set the GPWS INOP discrete in addition to the CALLOUT INOP discrete to prevent mode 6 task failure being unannounced.
 - (3) Several changes will be implemented in the application software to reduce processor loading.
 - (4) The application software will be updated so that the ILS Mode 2B parameter is not used by the smart 500 callout.

- (5) The logic for disabling the TAD alerting and display functions will be updated to use the parameter Distance to Destination Runway Invalid instead of Runway Airport Designator Invalid.
- (6) The application software will be updated so that nuisance alerts will not be generated at or near airports with complex runway geometries.
- (7) The application software will be updated so that the terrain displayable discrete output is extinguished if the display range is NCD.
- Mod 2 to Application Software Version 208 implements the following change:
 - (1) Converted the heading and track input filters from Linear to Circular. Due to an error in a filter applied to this input, the filtered heading or track output can be temporally incorrect when the aircraft is on a 180° heading or track.
- Mod 3 to Application Software Version 208 implements the following change:
 - (1) Honeywell has discovered an EGPWS power up initialization issue when using Envelope Modulation Database B05. To correct this issue, Honeywell is implementing a minor MOD to the Application Software to correct this particular problem and also to prevent future issues with new Envelope Modulation Databases.

965-0976-0xx-208-208 to 965-0976-0xx-210-210 – Service Bulletin 012-0687-134 (965-0976-0xx-34-34)

965-0976-0xx-210-210 to 965-0976-0xx-210 Mod 1-210 – Service Bulletin 012-0687-156 (965-0976-0xx-34-56)

965-0976-0xx-210 Mod 1-210 to 965-0976-0xx-210 Mod 2-210 - Service Bulletin 012-0687-170 (965-0976-XXX-34-70)

- Added support for the following aircraft:
 - Bombardier RJ 100/200 with integrated Collins ProLine IV display (aircraft type 47)
 - Cessna CJ 1 with integrated Collins ProLine 21 display (aircraft type 37)
 - Cessna CJ 2 with integrated Collins ProLine 21 display (aircraft type 38)
 - Hawker Horizon with integrated Honeywell Primus EPIC display (aircraft type 110)
 - Beech Premier 1 with integrated Collins ProLine 21 display (aircraft type 112)
- Changed support for the following existing aircraft types:
 - Cessna Citation Excel (aircraft type 103/167) updated FDR bus 2 range input to use the correct data bits.
 - CL-604 (aircraft type 40) updated fault monitoring logic to prevent SAT faults while the aircraft is on the ground.
 - DeHavilland Dash 8-400 (aircraft type 88) updated to add integrated Sextant EFIS display with Peaks capability.
 - Gulfstream G-IV/G-V (aircraft types 79/87/96/104) added option to show "TERR" or "GPWS" when terrain is selected.
 - Lear 60 (aircraft type 078) updated interface to remove True Heading, allow internal computation of true heading
- Redefined use of program pins 18 and 19 to select alternate display types or variant display types. Several new display types were also added and are selectable using these program pins.
- Selection of the WGS-84 GPS altitude reference has been revised to use program pins 18 and 19 in combination, or program pin 11. Program pin 18/19 selection will override any selection made using program pin 11.
- Updated ground history fault storage to include the Terrain Not Available condition and any associated fault messages.
- Revised FMC position error processing to eliminate terrain not available indications during take-off roll.
- Revised Horizontal Figure of Merit (HFOM) validity processing to set the GPS position invalid when HFOM is invalid.
- Disabled all fault monitoring of the Terrain functions when terrain is inhibited by program pin.
- Updated the Terrain function for all integrated display aircraft types to set Terrain Awareness Not Available when the required input signals are set to No Computed Data (NCD).
- The following changes were made, within the guidelines of TSO-C92c, to reduce potential Mode 2 or 4 nuisance alerts:
 - Reducing the Mode 2A upper limit to 1250 feet when the Terrain Awareness Functions are of high integrity.
 - Selecting Mode 2B when the aircraft is within 5 NM and 3500 ft of the destination runway, and the Terrain Awareness Functions are of high integrity.
 - Disabling the Mode 4 airspeed expansion when the aircraft is not in landing configuration and Terrain Clearance Floor is available or Terrain Awareness Functions are of high integrity.
- Added the Runway Field Clearance Floor (RFCF) alert function. RFCF alerts are based on height above the destination runway and provide landing short protection for runways that are significantly higher than the surrounding terrain.
- Updated Runway Selection logic to reduce nuisance alerts.
- Updated the Terrain Clearance Floor (TCF) function to reduce the occurrence of nuisance warnings via new envelope that is set to a minimum of 245 feet if the current aircraft position is not within 45° of the end of the destination runway.
- Increased the look-ahead distance from 4 nm to 8 nm to improve alerts before impact during high speed cruise.
- Corrected a Terrain Awareness display anomaly that caused threatening terrain to be inaccurately displayed at ranges 30 NM or greater.
- Updated Terrain Awareness logic to prevent the inhibit of the terrain function when the aircraft is not near a runway contained in the runway database.
- Updated radio altitude processing to perform reasonableness testing of the selected radio altimeter using Computed Terrain Clearance (Pseudo Radio Altitude). This change reduces the potential of nuisance warnings caused by false tracking of the radio altimeters. Updated ARINC 429 output to include Computed Terrain Clearance.
- Improved the operation of Geometric Altimetry when required input signals are failed.
- Added Corrected Barometric Altitude and Static Air Temperature validity discretes tests to the Level 6 self test sequence.
- Revised Glideslope Inhibit logic to limit the number of queued Glideslope alerts to one, after the release of the inhibit while still within the active alerting region.
- Corrected logic to enable the Smart 500 callout and ensure the callout is only disabled when the aircraft is on a valid Glideslope Front course and within 2 dots of glideslope deviation.
- Lowered the Windshear two-tone siren volume levels to match the levels provided in the classic MK5.

- Added Altitude Callout Menu #34: 2500(Radio Altitude), 500, 100, 50, 40, 30, 20, 10, MINIMUMS.
- Mod 1 to Application Software Version 210 implements the following change:
 - (1) Converted the heading and track input filters from Linear to Circular. Due to an error in a filter applied to this input, the filtered heading or track output can be temporally incorrect when the aircraft is on a 180° heading or track.
- Mod 2 to Application Software version 210 implements the following change:
 - (1) Honeywell has discovered an EGPWS power up initialization issue when using Envelope Modulation Database B05. To correct this issue, Honeywell is implementing a minor MOD to the Application Software to correct this particular problem and also to prevent future issues with new Envelope Modulation Databases.

965-0976-0xx-210-210 to 965-0976-0xx-212-212 – Service Bulletin 012-0687-140 (965-0976-0xx-34-40)

965-0976-0xx-212-212 to 965-0976-0xx-212 Mod 1-212 – Service Bulletin 012-0687-153 (965-0976-0xx-34-53)

965-0976-0xx-212 Mod 1-212 to 965-0976-0xx-212 Mod 2-212 - Service Bulletin 012-0687-170 (965-0976-XXX-34-70)

- Added support for the following aircraft:
 - Bombardier RJ 700 with integrated Collins ProLine IV display (aircraft type 46)
 - Beechjet 400A with integrated Collins ProLine IV display (aircraft type 163)
 - DeHavilland Dash 8-400 with integrated Sextant EFIS display, dedicated FMS/GPS inputs (aircraft type 152)
- Changed support for the following existing aircraft types:
 - Beechjet 400A (aircraft type 162) added optional DH label, removed ARINC 743 and alternate display #1 support.
 - DeHavilland Dash 8-400 (aircraft types 88, 152) added configurable 2500 foot callout to improve callout reliability.
- Revised SPZ-8000 and EDZ-605/805 EFIS overlay Peaks elevations location to avoid display conflict.
- Updated Envelope Modulation to use Geometric Altitude as primary altitude source (when available).
- Added labels 310/311, Present Position EGPWS Selected Latitude/Longitude, to EGPWS 429 output labels.
- The window for the 2500 foot callout was increased from 20 feet to 60 feet.
- Added new altitude callout menu 125 for “Approaching Minimums, Minimums, 1000, 500, 100”.
- Added Peaks functionality for Primus 1000/2000, Collins ProLine II and IV, Bendix IN182A/812A/842A/862A aircraft. All EGPWS displays now support Peaks functionality.
- Added KCPB display bus support for displays software enabled to use the function. Displays include Honeywell GNS-XLS or Primus radar indicators (via AvTech DSU) or TRA-45A, Avidyne FlightMax and Universal MFD-640.
- Updated Mode 4 logic to use airspeed validity and not inhibit Mode 4 alerts for zero airspeed. These changes were made within the guidelines of TSO-C92c and TSO C151a.
- Updated airspeed processing to limit the input to values greater than or equal to 40 knots. This change was made to prevent the use of zero indicated airspeed, which has been encountered in some simulators.
- Updated the Terrain Clearance Floor (TCF) function to reduce the occurrence of nuisance warnings in geographical areas with complex runway geometry.
- Updated Honeywell bank angle logic to correctly ratchet the advisory at 120% and 140% of the bank angle threshold at altitudes below 130 feet.
- Updated the Mode 4 voice ratchet logic to consistently give the initial Mode 4 alert upon entering the warning envelope. Prior to -212-212 the EGPWS may not issue the initial Mode 4 alert on a subsequent approach, if the gear or flaps are deployed while a Mode 4 callout is in progress and a go around is then executed.
- Updated the computed altitude rate logic to prevent nuisance windshear and GPWC alerts when performing in flight power cycles on the EGPWS while radio altitude is valid. This applies only to aircraft types with acceleration and attitude signals enabled.
- Updated ARINC 429 label 271 output to include additional discretes to be set in sequence during Self Test level 1.
- Mod 1 to Application Software Version 212 implements the following change:
 - (1) Converted the heading and track input filters from Linear to Circular. Due to an error in a filter applied to this input, the filtered heading or track output can be temporally incorrect when the aircraft is on a 180° heading or track.
- Mod 2 to Application Software Version 212 implements the following change:
 - (1) Honeywell has discovered an EGPWS power up initialization issue when using Envelope Modulation Database B05. To correct this issue, Honeywell is implementing a minor MOD to the Application Software to correct this particular problem and also to prevent future issues with new Envelope Modulation Databases.

965-0976-0xx-212-212 to 965-0976-0xx-213-213 – Service Bulletin 012-0687-147 (965-0976-0xx-34-47)

965-0976-0xx-213-213 to 965-0976-0xx-213 Mod 1-213 – Service Bulletin 012-0687-158 (965-0976-0xx-34-58)

965-0976-0xx-213 Mod 1-213 to 965-0976-0xx-213 Mod 2-213 - Service Bulletin 012-0687-170 (965-0976-XXX-34-70)

- Added support for the following aircraft:
Beechcraft 300F with non-integrated Bendix EFIS 10 display (aircraft type 74)
IAI Galaxy with integrated Collins ProLine 4 display (aircraft type 154)
- Changed support for the following existing aircraft types:
Embraer EMB-145/EMB-135 (aircraft type 33) updated AHRS buses to be IRS/AHRS bus and added binary Peaks elevations support for Primus 1000
Citation Jet 1 CJ1 (aircraft type 37) added Windshear support
Canadair Global Express (aircraft type 97) added binary Peaks elevations support for Primus 2000
Citation Jet 1 (CJ1) and Citation Jet 2 (CJ2) (aircraft types 37 and 38) added overlay Peaks elevations support for integrated Collins ProLine 21.
- Added support for Honeywell Primus Epic CDS/R with binary Peaks elevations.
- Added support for Honeywell Primus Epic CDS/R with overlay Peaks elevations.
- Added Callout Menu 60: RADIO ALTIMETER (female voice @ 2500), 1000, 500, 100, 50, 30, 20, 10.
- Added Callout Menu 62: 50 ABOVE (female voice), DECIDE (female voice), RADIO ALTIMETER (female voice @ 2500), 1000, 500, 100, 50, 30, 20, 10.
- Added Callout Menu 65: DECIDE (female voice), RADIO ALTIMETER (female voice @ 2500), 1000, 500, 100, 50, 30, 20, 10.
- Added Callout Menu 103: 500, 100, 50, 30, 20.
- Added Callout Menu 106: MINIMUMS, 1000, 500, 300, 200, 50, 40, 30, 20, 10, 5.
- Added new capabilities to KCPB (KC Picture Bus) algorithms to expand pool of supported display interfaces.
- Added on-ground reset logic for INTERNAL GPS FAULT message.
- Mod 1 to Application Software Version 213 implements the following change:
(1) Converted the heading and track input filters from Linear to Circular. Due to an error in a filter applied to this input, the filtered heading or track output can be temporally incorrect when the aircraft is on a 180° heading or track.
- Mod 2 to Application Software Version 213 implements the following change:
(1) Honeywell has discovered an EGPWS power up initialization issue when using Envelope Modulation Database B05. To correct this issue, Honeywell is implementing a minor MOD to the Application Software to correct this particular problem and also to prevent future issues with new Envelope Modulation Databases.

965-0976-0xx-213-213 to 965-0976-0xx-214-214 – Service Bulletin 012-0687-152 (965-0976-0xx-34-52)

965-0976-0xx-214-214 to 965-0976-0xx-214 Mod 1-214 Mod 1 – Service Bulletin 012-0687-154 (965-0976-0xx-34-54)

965-0976-0xx-214 Mod 1-214 Mod 1 to 965-0976-0xx-214 Mod 2-214 Mod 1 - Service Bulletin 012-0687-170 (965-0976-XXX-34-70)

- Added support for the following aircraft:

Astra SPX with ProLine 4 Integrated Terrain Display (aircraft type 156)

FAA Lear 60 and CL600 Calibration Aircraft configurations with MLS interface (aircraft type 76)

- Changed support for the following existing aircraft types:

Added support for internal 24 Channel GPS card (“Mercury GPS”) to all aircraft types *except* the following:

46 – CRJ-700/900

47 – CRJ-100/200

97 – Global Express

114 – MD-80 AA EFIS

115 – MD-80 AA non-EFIS

116 – 757-200 Saudia

PN 965-0976-06x is required. ARINC 429 Channel 18 (pins MP-6C/6D) are internally hard-wired to the internal GPS receiver and can be used as GPS output for other devices. Program pin 7 must be configured for GPS Overlay to activate the Mercury GPS. Pins TP-6B/6C can also be used as GPS output for other devices. Note that PN 965-0976-06x units can only provide RS-232 communication via the P1 front panel connector, as pins TP-6B/6C are dedicated to GPS output.

In response to a Bombardier requirement, the CRJ-700 interface (aircraft type 46) has been adjusted to have just the TSO-C92c (Ground Proximity Warning) and TSO-C117a (Reactive Windshear) functions active. The TSO-C151a Class A (Terrain Awareness and Warning) functions have been made inactive independent of the "Terrain Awareness and TCF Inhibit" program pin for this aircraft type ID only.

Modified Saab 2000 interface (a/c type 36) to require #1 GPS input

Modified the Global Express (aircraft type 97) CAIMS Interface in response to the aircraft manufacturer's testing.

Modified Dornier 328 (aircraft type 35) Label 171 handling to allow self-test operation when Terrain Awareness is disabled.

Added TCAS Inhibit discrete outputs (active during EGPWS Caution or Warning, not Advisory Callouts) to the following aircraft types:

39 – Non-Integrated CL604

40 – Integrated CL604

81 – CL-601 Rosemount AOA

85 – CL-601 SafeFlight AOA

97 – Global Express

166 – Lear 45 Integrated Display

- Optimized the Take-off/Approach logic to pre-arm the trigger for the 2500-foot Altitude Call-out (DHC-8-400 configuration only).
- Added a pin programmable 500-foot callout option to the altitude call-out menus. This callout differs from the Smart 500 callout, in that this callout will enunciate 500 on all approaches, regardless of ILS tuned status.
- Added a new Altitude Call-out Menu #59: 1000, 500, 100, 50, 30, 10.
- Added a new Altitude Call-out Menu #104: Plus 100, Minimum, 200, 50, 30, 20, 10.
- Modified the existing KCPB Display option such that Geometric Altitude overlay text labeled "MSL" is now labeled as "GSL".
- Added a second KCPB Display option without Geometric Altitude overlay text.
- Added BAe/Avro RJ Honeywell EFIS Bolt-On (Non-Integrated) Terrain Display as a selectable display via program pins 18/19.
- Relocated the Collins ProLine II Peaks Mode elevation values to prevent obstruction by EFIS symbology.
- Enabled the blue (cyan) water presentation as a basic part of the Collins ProLine 21 Peaks Mode terrain display.
- Optimized the DHC-8-400 Peaks Mode Terrain Display.

- Made the Vertical Profile Label 273 optional for Bendix IN182A/812A/842A/862A displays.
 - Corrected the EFIS 10 implementation to include Terrain and Relay Selection in the ICD.
 - Prioritized “Terrain Not Available” above “Terrain Inhibit” when using KCPB display format.
 - Added a Query/Response Vertical Situation Display (VSD) Control as part of KCPB processing.
 - Modified KCPB to display VSD based on heading (not track) when groundspeed is less than 60 knots. This change was required to allow the GNS-XLS terrain display “Mode” line select key to function when the aircraft groundspeed is less than 60 knots.
 - Improved the KCPB Response to Display Range changes.
 - Converted the Heading and Track input filters from linear type to circular type
 - Optimized the ADC fault handling to better accommodate ADC input failures at power-up
 - Optimized the AHRS/IRS bus hunting logic to use Mag Heading (Label 320) if Mag Track (Label 317) not present
 - Suppressed the Attitude Mode messages caused by AHRS label 270 on aircraft types using AHRS/IRS bus hunting
 - Optimized the WGS-84 implementation such that the WGS-84 altitude correction is prevented when using the EGPWS internal GPS card as a position source, thereby preventing a possible over-correction of the MSL corrected altitude
 - Optimized Geometric Altitude time constants to help filter short term GPS errors
 - Added a GPS VFOM filter to improve Geometric Altitude calculation immediately following the reacquiring of satellites
 - Corrected the Runway Distance Computation when the International Date Line is between aircraft and runway locations.
 - Suppressed the output of WS/GPWS/TERR INOP bits on Label 274 bit during all levels of self test in aircraft where these functions are disabled.
 - Corrected the flashing lamp logic to properly flash cockpit alert lamps when the Mode 2 Altitude Gain function is active. In previous versions of software the cockpit alert lamps would illuminate continuously when the Mode 2 Altitude Gain was active, regardless of flashing lamp configuration setting.
 - Modified Self-Test Level 3 to output “Low Volume” voice when Low Volume is activated via discrete input or within an altitude call-out menu.
 - Improved fault history command handling when large amounts of data are stored in the fault records.
- Mod 1 to Application Software Version 214 and Configuration Software Version 214 implements the following change:
 - (1) Operational experience of EGPWS using the internal GPS receiver (PN 965-0976-020-XXX-XXX) has shown during normal operation the internal GPS receiver may infrequently "drop out " of normal navigation and go into Dead Reckoning mode. These drop outs are normally of short duration, approximately 10 seconds or less. During the drop out to Dead Reckoning mode the EGPWS terrain alerting and display may go INOP. To avoid these short INOP conditions, the EGPWS software was modified to add a "Dead Reckoning" algorithm that will continue to provide position data to the EGPWS for a short period of time when the GPS receiver transitions to Dead Reckoning mode.
 - Mod 2 to Application Software Version 214 implements the following change:
 - (1) Honeywell has discovered an EGPWS power up initialization issue when using Envelope Modulation Database B05. To correct this issue, Honeywell is implementing a minor MOD to the Application Software to correct this particular problem and also to prevent future issues with new Envelope Modulation Databases.

965-0976-0xx-214-214 to 965-0976-0xx-216-216 – Service Bulletin 012-0687-161 (965-0976-0xx-34-61)

965-0976-0xx-216-216 to 965-0976-0xx-216 Mod 1-216 Mod 1 – Service Bulletin 012-0687-163 (965-0976/1690-xxx-34-63)

965-0976-0xx-216 Mod 1-216 Mod 1 to 965-0976-0xx-216 Mod 2-216 Mod 1 - Service Bulletin 012-0687-170 (965-0976-xxx-34-70)

965-0976-0xx-216 Mod 2-216 Mod 1 to 965-0976-0xx-216 Mod 3-216 Mod 3 – Service Bulletin 012-0687-197 (965-0976/1690-34-97)

- Changed support for the following existing aircraft types:
 - Bombardier CRJ-700 (Aircraft Type 46) - Reactivated Terrain Awareness and Warning System functions that were disabled in 214-214 software
 - Dornier DO-328 Jet (Aircraft Type 35) - Changed default Terrain Awareness Auto Pop-Up range from 5 to 10 nm
 - Raytheon Hawker Horizon (Aircraft Type 110) - Updated MAU bus interface to read ARINC 429 label 171 as Type 2 (EGPWS monitors bit 23 for self-test initiation)
- Added the display of Terrain Database Version to the Level 1 Self Test terrain display test pattern as "TDB XXX" where XXX is the installed Terrain Database Version. Note that for displays currently showing a raster drawn self-test annunciation (TERR-ST or equivalent), this annunciation will be replaced by "TDB XXX".
- Added EFIS 10 display configuration that provides a $\pm 60^\circ$ display sweep angle to match the WXR sweep.
- Revised the internally computed vertical speed algorithm for aircraft without IRS inputs to prevent nuisance windshear warnings during aggressive pitch-attitude takeoffs.
- Added Internal GPS receiver Dead Reckoning function. Improves system availability by providing short-term position data during times when the EGPWS Internal GPS receiver transitions to dead reckoning mode.
- Added Altitude Callout Menu #31: RADIO ALTIMETER (female voice at 2500 feet), 1000, 800, 500, 400, 300, 200, 100, 50, 40, 30, 20, 15.
- Added Altitude Callout Menu #33: PLUS HUNDRED, MINIMUMS, 2500, 1000, 500, 100, 50, 30, 20, 10, 5.
- Revised Roll Rate initialization processing to reduce possibility of nuisance Bank Angle alerts when roll signal transitions from an Invalid to a Valid state.
- Revised position source selection for EGPWS with internal Mercury GPS. Use of FMS as a reversionary position source input is inhibited unless FMS Nav Mode data available.
- Revised interface processing for Primus EPIC CDS and CDS/R label 171 to only acknowledge range and auto-range confirm bits.
- Revised Fault History recording to prevent erroneous recording of internal GPS receiver faults during ATP.
- Added ability to record last valid program pin configuration in Status History to improve ATP troubleshooting.
- Mod 1 to Application Software Version 216 and Configuration Software Version 216 implement the following changes:
 - (1) Initiation of Self-Test Level 5 can result in the illumination of the COMPUTER FAIL lamp on the front of the EGPWS LRU. This problem is intermittent and can occur when the fault history memory has reached its capacity. The EGPWS will continue to function and there is no flight deck effect. However, the red COMPUTER FAIL light is illuminated and can be cleared by either cycling power or erasing fault history. The application software is being modified to increase the allocated memory size and eliminate the potential for future COMPUTER FAIL indications due to insufficient fault history memory.
 - (2) Artifacts can remain on the display after running the EGPWS self-test or while flying with 5nm range selected. The problem manifests itself as small dots resembling a starry night. It is most prevalent with GNS-XLS installations due to the use of KCPB, but it is not limited to this display type. This problem is considered a nuisance and can be cleared by rebooting the EGPWS or switching display modes. The application code is being modified to correctly initialize a variable in the Digital Signal Processor (DSP) software and prevent this anomaly from occurring regardless of the selected display type.
 - (3) The blended Geometric Altitude solution initial conditions can be incorrectly preset which can limit the number of Geometric Altitude components used to ultimately derive the terrain awareness corrected altitude. This can result in small, momentary changes in the altitude used by the EGPWS to display and detect terrain with little or not cockpit effect. It can occur following a power-up or recovery from an invalid pressure altitude condition. The application code is being modified to correctly preset the GPS altitude used by Geometric Altitude.
 - (4) The current implementation of the Geometric Altitude reasonableness check can allow some unreasonable altitude values to be included for short periods of time in the overall altitude solution. This can result in momentary changes in

the altitude used by the EGPWS to display and detect terrain if valid, unreasonable values are received from outside sensors. The application code is being modified to prevent the use of unreasonable altitude values in the blended Geometric Altitude solution.

- (5) The radio altitude component of Geometric Altitude is determined by sampling the Radio Altimeter input. The application software over samples the radio altitude input and delays the lowest altitude sample from getting to the blended altitude solution. This can produce small, momentary changes in the altitude used by the EGPWS during go-around when radio altitude is weighted more heavily in the blended geometric altitude solution. The application code is being modified to correct the number of radio altitude samples and remove the delay.
- Mod 2 to Application Software Version 216 implements the following change:
 - (1) Honeywell has discovered an EGPWS power up initialization issue when using Envelope Modulation Database B05. To correct this issue, Honeywell is implementing a minor MOD to the Application Software to correct this particular problem and also to prevent future issues with new Envelope Modulation Databases.
 - Mod 3 to Application Software Version 216 and Configuration Software Version 216 implement the following changes:
 - (1) Eliminate an intermittent terrain display failure condition. The EGPWS provides a terrain display picture in the cockpit using ARINC 453 bus. In some EGPWS units the DSP serial output bus could latch up during power up resulting in a loss of 453 (terrain) data to the display. This failure mode does not happen on every power up and is in fact random and infrequent. This upgrade initializes a DSP register to eliminate this failure condition. For further details regarding this issue see Service Information Letter EGPWS-MKV-MKVII-51.
 - (2) Eliminate very rare EGPWS INOP conditions due to a software general protection fault occurring during power up. This upgrade adds an additional interrupt routine.
 - (3) Eliminate nuisance flickering of the external fault light on the EGPWS computer. For EGPWS installations that utilize a GPS input it is possible to see a cycling of the external fault light on the EGPWS computer itself due to issues with the fault monitoring of the GPS HIL signal. The HIL signal is used as a back up to the HFOM signal should the HFOM signal fail. Since HIL is a back up signal, the fault logic issue would drive only the external fault light on the EGPWS computer and not any aircraft EGPWS INOP indications. This failure mode is an inconvenience to the maintenance crew and has no flight deck effect. This upgrade minimally revises the HIL fault logic to correct this condition.

965-0976-0xx-216-216 to 965-0976-0xx-217-217 – Service Bulletin 012-0687-167 (965-0976-xxx-34-67)

965-0976-0xx-217-217 to 965-0976-0xx-217 Mod 1-217 - Service Bulletin 012-0687-170 (965-0976-xxx-34-70)

- Changed support for the following existing aircraft types:
 - AVRO RJ (A/C Types 54, 55) - Updated EFIS display option for either single or dual display select switches.
 - Bombardier CL-604 (A/C Type 40) - Updated interface to mask out True Airspeed faults while the aircraft is on the ground with probe heaters activated.
 - FIAS CL-601/3R & Learjet 60 (A/C Type 76) - Updated interface to change IOC #1 and IOC #2 buses from low speed to high speed.
 - Dassault Falcon 20, 2000, 50EX, 50 (A/C Types 77, 91, 92, 94) - Added option for ProLine 21 Minimum Decision Altitude (MDA)/Decision Height (DH) based callouts via program pin selection.
 - Gulfstream G-100/IAI Astra SPX (A/C Type 90) - Added option to select low speed FMS bus.
 - Gulfstream G-200/IAI Galaxy (A/C Type 154) - Added option for ProLine 21 Minimum Decision Altitude (MDA)/Decision Height (DH) based callout via program pin selection.
 - Saab 2000 (A/C Type 36) - Added support for a non-integrated Collins ProLine 4 display.
- Updated Honeywell SPZ8000, Primus 880/660/440 and EDZ805 display types to move terrain database version string up slightly on display to remove conflict with range ring.
- Added support for the older style non-integrated "bolt-on" Honeywell EDZ802 display. With Peaks activated a moving marker will be displayed just below the lower Peaks value.
- Added support for the newer style non-integrated "bolt-on" Honeywell EDZ806 display. With Peaks activated a moving marker will be displayed just below the lower Peaks value.
- Geometric Altitude algorithm improvements were incorporated to prevent inadvertent use of erroneous or unstable altitudes such as an altitude spike or large negative value.
- Added Altitude Callout Menu #109: APPROACHING MINIMUMS, MINIMUMS, 2500, 500, 100, 50, 40, 30, 20, 10.
- Mod 1 to Application Software Version 217 implements the following change:
 - (1) Honeywell has discovered an EGPWS power up initialization issue when using Envelope Modulation Database B05. To correct this issue, Honeywell is implementing a minor MOD to the Application Software to correct this particular problem and also to prevent future issues with new Envelope Modulation Databases.

965-0976-0xx-217-217 to 965-0976-0xx-218-218 – Service Bulletin 012-0687-176 (965-0976/1690-34-76)

965-0976-0xx-218-218 to 965-0976-0xx-218 Mod 1-218 Mod 1 – Service Bulletin 012-0687-197 (965-0976/1690-34-97)

- Added support for the following aircraft:
Gulfstream/IAI G-150 aircraft (Aircraft Type 177) with provisional windshear interface
- Changed support for the following existing aircraft type:
Saab 2000 (Aircraft Type 036) - Revised IOC #2 bus interface to remove FMC labels 310 and 311, which are not used
- Added Runway Awareness Advisory System (RAAS) function. RAAS is a software enhancement hosted in the EGPWS. RAAS uses Global Positioning System (GPS) position data and the Honeywell EGPWS Database to provide aural advisories that supplement flight crew awareness of position during ground operations and on approach to landing. EGPWS basic ground proximity warnings, reactive windshear alerting, and Terrain Awareness (TAWS) protection and operation are unaltered by the addition of RAAS. RAAS is a chargeable upgrade. Contact Honeywell - Airlines and Avionics Products - Order Administration for details, required equipment, and pricing. Visit www.egpws.com for more details on RAAS.
- Reduced nuisance Mode 2 alerts where radar vectoring regularly places aircraft within Mode 2 warning boundary. When GPS position is of High Integrity, and terrain data is of high quality, the Mode 2 boundary will be limited to a maximum of 950 feet.

NOTE: When active, this change maintains an equivalent level of safety, and provides a reduced nuisance alert rate as provided for in TSO-C151b under Section 1.3, paragraph e.
- Increased Terrain Awareness Look-up warning time. Revised both the caution and warning look-up envelopes. Increased the look-ahead distance and terrain clearance values. Added adjustment for ground speed effect based on high descent rates.
- Revised the Terrain Awareness Alerting and Display cut-off altitude. This will improve caution and warning times for particular scenarios since the alerting cut-off altitude is now a function of the runway quality and VFOM/HFOM.
- Moved the Terrain Clearance Floor protection closer to the runway, and added an additional breakpoint on the curve close to the runway with a 200 ft/min slope to provide additional protection for shallow approaches.
- Changed Terrain Clearance Floor algorithm by moving the lateral area of curve expansion out 1.0 NM to facilitate maneuvering near a runway.
- Improved radio altitude reasonableness logic. Reduced nuisance basic GPWS alerts due to false radio altimeter tracking by enabling Radio Altimeter reasonableness testing when TAD is available and operating with high integrity, and the aircraft is at least 2500 feet above the terrain (was 4000 feet). Radio Altitude is set invalid for a maximum of 60 seconds when the selected source indicates a terrain clearance that is significantly less than the computed terrain clearance.
- Improved monitoring of GPS position data by adding GPS horizontal step change detection logic, and increasing the recovery time from invalid GPS signals.
- Revised GPS reasonableness and vertical step change logic to reduce nuisance alerts that are caused by GPS altitude step changes.
- Added Dead Reckoning function for all GPS interfaces (both internal and external) to improve system availability by providing short-term position data during times when the GPS receiver transitions to dead reckoning mode.
- Added Altitude Callout Menu #111: APPROACHING MINIMUMS, MINIMUMS, 2500, 1000, 500, 50, 40, 30, 20, 10
- Mod 1 to Application Software Version 218 and Configuration Software Version 218 implement the following changes:
 - (1) Eliminate an intermittent terrain display failure condition. The EGPWS provides a terrain display picture in the cockpit using ARINC 453 bus. In some EGPWS units the DSP serial output bus could latch up during power up resulting in a loss of 453 (terrain) data to the display. This failure mode does not happen on every power up and is in fact random and infrequent. This upgrade initializes a DSP register to eliminate this failure condition. For further details regarding this issue see Service Information Letter EGPWS-MKV-MKVII-51.
 - (2) Eliminate very rare EGPWS INOP conditions due to a software general protection fault occurring during power up. This upgrade adds an additional interrupt routine.
 - (3) Eliminate nuisance flickering of the external fault light on the EGPWS computer. For EGPWS installations that utilize a GPS input it is possible to see a cycling of the external fault light on the EGPWS computer itself due to issues with

the fault monitoring of the GPS HIL signal. The HIL signal is used as a back up to the HFOM signal should the HFOM signal fail. Since HIL is a back up signal, the fault logic issue would drive only the external fault light on the EGPWS computer and not any aircraft EGPWS INOP indications. This failure mode is an inconvenience to the maintenance crew and has no flight deck effect. This upgrade minimally revises the HIL fault logic to correct this condition.

965-0976-0xx-218-218 to 965-0976-0xx-219-219 – Service Bulletin 012-0687-178 (965-0976-34-78)

- Changed support for the following existing aircraft types:

BAE Avro RJ (Aircraft Types 54 and 55) - added support for Fine Latitude and Fine Longitude labels to GPS input busses to support the RAAS function.

Cessna Citation Excel (Aircraft Types 103 and 167) - added support for Fine Latitude and Fine Longitude labels to GPS input busses to support the RAAS function.

De Havilland Dash8-400 (Aircraft Type 88) - added support for Fine Latitude and Fine Longitude labels to GPS input busses to support the RAAS function.

965-0976-0xx-219-219 to 965-0976-0xx-220-220 – Service Bulletin 012-0687-181 (965-0976-xxx-34-81)

965-0976-0xx-220-220 to 965-0976-0xx-220 Mod 1-220 Mod 1 – Service Bulletin 012-0687-187 (965-0976-xxx-34-87)

965-0976-0xx-220 Mod 1-220 Mod 1 to 965-0976-0xx-220 Mod 2-220 Mod 2 – Service Bulletin 012-0687-195 (965-0976-34-95)

- Added support for the following aircraft:
Dornier DO-328 Turboprop (Aircraft Type 41) without windshear, terrain display on "bolt-on" Primus 2000 EFIS (single bus only)
- Changed support for the following existing aircraft type:
Raytheon Hawker Horizon (Aircraft type 110) - added CMC input processing and new display type
- Added support for Honeywell Primus 2000 non-integrated "bolt-on" with single SCI control bus
- Mod 1 to Application Software Version 220 and Configuration Software Version 220 implement the following change:
(1) Changes were made to Airbus production configurations that do not affect other aircraft. Therefore, non-Airbus installations do not need to install -220 Mod 1 -220 Mod 1
- Mod 2 to Application Software Version 220 and Configuration Software Version 220 implement the following changes:
(1) Eliminate an intermittent terrain display failure condition. The EGPWS provides a terrain display picture in the cockpit using ARINC 453 bus. In some EGPWS units the DSP serial output bus could latch up during power up resulting in a loss of 453 (terrain) data to the display. This failure mode does not happen on every power up and is in fact random and infrequent. This upgrade initializes a DSP register to eliminate this failure condition. For further details regarding this issue see Service Information Letter EGPWS-MKV-MKVII-51.
(2) Eliminate very rare EGPWS INOP conditions due to a software general protection fault occurring during power up. This upgrade adds an additional interrupt routine.
(3) Eliminate nuisance flickering of the external fault light on the EGPWS computer. For EGPWS installations that utilize a GPS input it is possible to see a cycling of the external fault light on the EGPWS computer itself due to issues with the fault monitoring of the GPS HIL signal. The HIL signal is used as a back up to the HFOM signal should the HFOM signal fail. Since HIL is a back up signal, the fault logic issue would drive only the external fault light on the EGPWS computer and not any aircraft EGPWS INOP indications. This failure mode is an inconvenience to the maintenance crew and has no flight deck effect. This upgrade minimally revises the HIL fault logic to correct this condition.

965-0976-0xx-220-220 to 965-0976-0xx-222-222 – Service Bulletin 012-0687-185 (965-0976/1690-34-85)

965-0976-0xx-222-222 to 965-0976-0xx-222 Mod 1-222 Mod 1 – Service Bulletin 012-0687-197 (965-0976/1690-34-97)

- Added support for the following aircraft:
 - FAA-FIAS CL601/3A (Aircraft Type 142) with windshear
 - FAA-FIAS Lear 60 (Aircraft Type 80) with windshear
 - CL601/3A with SafeFlight AOA (Aircraft Type 161) - Same as Type 81 except pin TP-12B functions as a TCAS Inhibit
 - CL601/3A with Rosemont AOA (Aircraft Type 165) - Same as Type 85 except pin TP-12B functions as a TCAS Inhibit
- Changed support for the following existing aircraft types:
 - Bombardier CL601/3A (Aircraft Types 81 and 85) - updated output discrete definitions to remove TCAS Inhibit function from pin TP-4D
 - Gulfstream G-150 (Aircraft Type 177) - changed AOA from analog to digital interface, changed windshear landing flap angle, changed Audio On to TCAS Inhibit, added optional IRS input
 - Learjet 60 (Aircraft Type 78) - changed IOC Display Range label from 155 to 271 to support terrain display during ARC mode
- Updated GPS validity logic to set True Track invalid when Ground Speed is less than 10 knots
- Revised RAAS voice configuration to correct aural annunciation conflicts when Audio Declutter option is disabled
- Added ability to adjust the volume of the individual RAAS advisories independent of caution/warning volume level via the loadable RAAS Configuration Database (RCD) card
- Added Altitude Callout Menu #112: PLUS HUNDRED, MINIMUMS, 2500, 1000(baro), 500(baro), 200, 100, 50, 40, 30, 20, 10
- Added Altitude Callout Menu #113: PLUS HUNDRED, MINIMUMS, 100, 50, 30, 20, 10
- Mod 1 to Application Software Version 222 and Configuration Software Version 222 implement the following changes:
 - (1) Eliminate an intermittent terrain display failure condition. The EGPWS provides a terrain display picture in the cockpit using ARINC 453 bus. In some EGPWS units the DSP serial output bus could latch up during power up resulting in a loss of 453 (terrain) data to the display. This failure mode does not happen on every power up and is in fact random and infrequent. This upgrade initializes a DSP register to eliminate this failure condition. For further details regarding this issue see Service Information Letter EGPWS-MKV-MKVII-51.
 - (2) Eliminate very rare EGPWS INOP conditions due to a software general protection fault occurring during power up. This upgrade adds an additional interrupt routine.
 - (3) Eliminate nuisance flickering of the external fault light on the EGPWS computer. For EGPWS installations that utilize a GPS input it is possible to see a cycling of the external fault light on the EGPWS computer itself due to issues with the fault monitoring of the GPS HIL signal. The HIL signal is used as a back up to the HFOM signal should the HFOM signal fail. Since HIL is a back up signal, the fault logic issue would drive only the external fault light on the EGPWS computer and not any aircraft EGPWS INOP indications. This failure mode is an inconvenience to the maintenance crew and has no flight deck effect. This upgrade minimally revises the HIL fault logic to correct this condition.

965-0976-0xx-222-222 to 965-0976-0xx-224-224 – Service Bulletin 012-0687-206 (965-0976-34-106)

965-0976-0xx-224-224 to 965-0976-0xx-224 Mod 1-224 Mod 1 – Service Bulletin 012-0687-216 (965-0976-34-116)

- Added support for the following aircraft:
 - Bombardier CL605 (Aircraft Type 56) with windshear
 - Cessna Citation Jet 3 (Aircraft Type 32) with windshear
- Changed support for the following existing aircraft type:
 - Gulfstream/IAI G-150 (Aircraft Type 177) - updated aero data for windshear
- Changed Runway Awareness Advisory System (RAAS) as follows:
 - Incorporated the antenna placement in the Distance Remaining advisories
 - Changed the Distance Remaining advisory logic so that an internal stack up of the Distance Remaining callouts cannot happen.
 - Enhanced the Distance Remaining callouts to happen either at 50% of a runway length (current implementation) or at a specified distance from the runway end (new implementation), as set by RAAS Configuration Database (RCD) option.
 - Improved simulator operation to suppress advisories during reposition.
 - Provided for the optional RAAS inhibit switch to cancel a RAAS advisory voice in progress, and to refrain from voicing the last advisory that occurred while inhibited upon deactivation of the inhibit.
 - Incorporated the position of the aircraft on the runway in the approaching runway – on ground advisory, such that, if past the runway centerline the advisory is suppressed.
- Added capability for detecting and suppressing spurious GPS ground speed spikes while an aircraft is on the ground. This was done to prevent nuisance alerts of the RAAS taxiway takeoff advisory.
- Improved GPS uncertainty computation when a GPS is deemed to be underestimating its own accuracy. This change will improve EGPWS and RAAS function availability for such GPS systems.
- Improved terrain display resolution for the 10, 20, 40, and 100 NM range settings. A side affect of this is that at these range settings, terrain may not be displayed out to the extreme lower left and right corners of the display when the aircraft is near 50 degrees latitude.
- Added new ARINC 429 output label 041 containing runway information intended to be used by HUD
- Added RAAS Inhibit to bit 29 of existing ARINC 429 output label 051
- Mod 1 to Application Software Version 224 and Configuration Software Version 224 implement the following changes:
 - (1) In PN 965-0976-020 (with internal PXpress GPS card), if the PXpress GPS card is used as the position source, it is possible one or more of the Runway Awareness Advisory System (RAAS) functions identified below will not work correctly:
 - a) On Taxiway
 - b) Approaching Runway on Ground
 - c) Distance Remaining on Landing
 - d) Distance Remaining on Rejected Takeoff.

This is caused by the ground speed and true track software that sets the GPS ground speed to zero while on the ground. This software is specific to the GPS-PXpress card. This modification changes the true track input software so that it is the same for all true track data. This allows the advisories that need the GPS ground speed (identified above) to work correctly.
 - (2) In PN 965-0976-020 (with internal pXpress GPS card), if the pXpress GPS card is used as the position source, there is a very small risk, only if given specific conditions, that a loss of the Terrain Awareness and Display function could occur. This condition will not be identified to the flight crew. The condition can only occur if all Radio Altitude data or all Airspeed data has failed during takeoff and stays failed during the flight.

- (3) In all EGPWS part numbers, the following modifications were made that have an effect on the RAAS function.
- a) The RAAS configuration database lets the Distance Remaining advisories start at a specified distance instead of at 50% of the runway length. It is possible that the Distance Remaining advisories could start 1000 feet (305 meters) before the specified distance if one of the conditions identified below occurs:
 - Very high speed landing
 - Rejected takeoff.

This modification removes the possibility that the Distance Remaining advisories will start before the specified distance if one of the conditions identified above occurs.
 - b) If the audio inhibit discrete is on, the last RAAS advisory can be saved and will be heard when the audio inhibit discrete goes off. This modification removes the possibility that the RAAS advisory will be heard when the audio inhibit discrete goes off.
 - c) If the EGPWS is connected to a Rockwell Collins GPS-4000 or GPS-4000A, it is possible to get an incorrect “On Taxiway” advisory. This occurs if incorrect data is received from a GPS-4000, GPS-4000A, or other source of GPS ground speed. This modification removes the possibility of an incorrect “On Taxiway” advisory for the above condition.

965-0976-0xx-224-224 to 965-0976-0xx-226-226 – Service Bulletin 012-0687-210 (965-0976-34-110)

965-0976-0xx-226-226 to 965-0976-0xx-226 Mod 1-226 Mod 1 – Service Bulletin 012-0687-217 (965-0976-34-117)

- Added support for the following aircraft:
 - Bombardier Challenger 300 (Aircraft Type 34) with windshear
 - Cessna Encore Plus (Aircraft Type 160) with windshear
 - FAA FIAS Beech 300 with ProLine 21 (Aircraft Type 60)
- Changed support for the following existing aircraft types:
 - Learjet 60 (Aircraft Type 78) - Added ProLine 21 as alternate display to support Learjet 60XR
 - Raytheon Hawker 4000/Horizon (Aircraft Type 110) - Added windshear detection capability
- Changed Runway Awareness Advisory System (RAAS) as follows:

Currently the top of the RAAS runway box is set at 800 feet, only 50 feet above the advisory threshold of 750 feet. This narrow window makes it difficult during repeated simulator testing of RAAS to make sure that the aircraft is in the box before an advisory is given. The height of the RAAS runway box will be increased from 800 feet to 1000 feet, for all MK V EGPWS platforms. NOTE: This does not affect the behavior of any of the RAAS advisories.

Improved the logic for picking the closest RAAS runway when multiple runways are possible, for all MK V EGPWS platforms
- Revised the behavior of the Audio Inhibit Discrete as it relates to RAAS. Revised to remove the condition where the last RAAS advisory occurring while the Audio Inhibit Discrete was active would remain in a queue and be annunciated when the Audio Inhibit Discrete was deactivated. Revised to immediately cancel a RAAS advisory voice in progress.
- Revised the behavior of the GPWS Inhibit Discrete so that activation of the input does not inhibit RAAS Advisories. The GPWS Inhibit Discrete continues to inhibit the TSO-C92c GPWS alerts and warnings.
- Improved the Flight History maintenance function by limiting nuisance recordings and adding additional parameters to support both of the internal GPS systems: Mercury and pXpress
- Modified the Terrain Awareness look-ahead logic to reduce nuisance warnings during some turning RNP approaches near significant terrain by modulating the CAUTION and WARNING look-up distance during turns. This can be done safely due to the improved containment limits brought about by the use of GPS navigation. The forward looking algorithms continue to meet TSO-C151b Class A and no flight test procedures/profiles are changing as a result of this modification.
- Revised the voice driver to not issue the second Sinkrate voice if the GPW Inhibit (from Windshear) or the Audio Inhibit input discrete is activated between the first and second Sinkrate voice, then deactivated shortly thereafter
- Revised the BITE RAM address test to fully test all address lines
- Mod 1 to Application Software Version 226 and Configuration Software Version 226 implement the following changes:
 - (1) In PN 965-0976-020 (with internal PXpress GPS card), if the PXpress GPS card is used as the position source, it is possible one or more of the Runway Awareness Advisory System (RAAS) functions identified below will not work correctly:
 - a) On Taxiway
 - b) Approaching Runway on Ground
 - c) Distance Remaining on Landing
 - d) Distance Remaining on Rejected Takeoff.

This is caused by the ground speed and true track software that sets the GPS ground speed to zero while on the ground. This software is specific to the GPS-PXpress card. This modification changes the true track input software so that it is the same for all true track data. This allows the advisories that need the GPS ground speed (identified above) to work correctly.
 - (2) In PN 965-0976-020 (with internal PXpress GPS card), if the PXpress GPS card is used as the position source, there is a very small risk, only if given specific conditions, that a loss of the Terrain Awareness and Display function could occur. This condition will not be identified to the flight crew. The condition can only occur if all Radio Altitude data or all Airspeed data has failed during takeoff and stays failed during the flight.

- (3) In all EGPWS part numbers, the following modifications were made that have an effect on the RAAS function.
- a) The RAAS configuration database lets the Distance Remaining advisories start at a specified distance instead of at 50% of the runway length. It is possible that the Distance Remaining advisories could start 1000 feet (305 meters) before the specified distance if one of the conditions identified below occurs:
 - Very high speed landing
 - Rejected takeoff.

This modification removes the possibility that the Distance Remaining advisories will start before the specified distance if one of the conditions identified above occurs.
 - b) If the EGPWS is connected to a Rockwell Collins GPS-4000 or GPS-4000A, it is possible to get an incorrect “On Taxiway” advisory. This occurs if incorrect data is received from a GPS-4000, GPS-4000A, or other source of GPS ground speed. This modification removes the possibility of an incorrect “On Taxiway” advisory for the above condition.

965-0976-0xx-226-226 to 965-0976-0xx-228-228 – Service Bulletin 012-0687-218 (965-0976-34-118)

- Added support for the following aircraft:

Cessna XLS+ with ProLine 21 (Aircraft Type 159) with windshear

- Changed support for the following existing aircraft types:

Bombardier CRJ-100/200 (Aircraft Types 43 and 47) and CRJ-700/900 (Aircraft Type 46) - Corrected the software to set the FCC Audio Inhibit to “False” only when both FCC mode words are invalid. Previously, the software set the term to “False” if only one of the mode words was invalid.

Dornier 328 (Aircraft Type 041) – Corrected Honeywell Primus 2000 display range interface

- Changed the Runway Awareness Advisory System (RAAS) as follows:

The RAAS configuration database lets the Distance Remaining advisories start at a specified distance instead of at 50% of the runway length. It is possible that the Distance Remaining advisories could start 1000 feet (305 meters) before the specified distance if one of the conditions identified below occurs:

- Very high speed landing
- Rejected takeoff.

This modification removes the possibility that the Distance Remaining advisories will start before the specified distance if one of the conditions identified above occurs.

If the EGPWS is connected to a Rockwell Collins GPS-4000 or GPS-4000A, it is possible to get an incorrect “On Taxiway” advisory. This occurs if incorrect data is received from a GPS-4000, GPS-4000A, or other source of GPS ground speed. This modification removes the possibility of an incorrect “On Taxiway” advisory for the above condition.

- Made the Flight History maintenance function better by limited nuisance recordings of on-ground faults
- Changed the preset logic of the Radio Altitude filter used in Mode 4, Unsafe Terrain Clearance. There have been incidents when a Mode 4 alert occurs after the Radio Altitude recovers from the Computed Terrain Clearance Reasonableness check. This minor change to the preset logic will decrease Mode 4 nuisance alerts caused by erroneous Radio Altitude values.
- The changes that are identified below are only for EGPWS Part Number 965-0976-020, with functional RAAS and internal PXpress GPS cards:

If the PXpress GPS card is used as the position source, it is possible one or more of the Runway Awareness Advisory System (RAAS) functions identified below will not work correctly:

- a) On Taxiway
- b) Approaching Runway on Ground
- c) Distance Remaining on Landing
- d) Distance Remaining on Rejected Takeoff.

This is caused by the ground speed and true track software that sets the GPS ground speed to zero while on the ground. This software is specific to the GPS PXpress card. This modification changes the true track input software so that it is the same for all true track data. This allows the advisories that need the GPS ground speed (identified above) to work correctly.

If the PXpress GPS card is used as the position source, there is a very small risk, only if given specific conditions, that a loss of the Terrain Awareness and Display function could occur. This condition will not be identified to the flight crew. The condition can only occur if all Radio Altitude data or all Airspeed data has failed during takeoff and stays failed during the flight.

965-0976-0xx-228-228 to 965-0976-0xx-230-230 – Service Bulletin D200907000033 (965-0976/1690-34-128)

965-0976-0xx-230-230 to 965-0976-0xx-230 Mod 1-230 Mod 1 – Service Bulletin D200911000028 (965-0976/1690-34-129)

- Added support for the following aircraft:
Cessna Citation Jet 4 (Aircraft Type 168) - Type 168 has a similar configuration to the Cessna Encore Plus except for the following differences:
 - The AOA data now comes from the ARINC 429 source (body AOA is on Label 224 and normalized AOA is on Label 241).
 - The landing flap configuration is set to 30 degrees.
 - The windshear type is set to parameterless.
- Changed support for the following existing aircraft types:
Cessna Encore Plus (Aircraft Type 160) - Flap angle LSB has been corrected to 0.0439453125 instead of 0.0439 to improve precision.
Cessna Citation Jet 1, 2, 3, CL-604 Integrated, Premier 1 (Aircraft Types 32, 37, 38, 40, 112) - Collins FMS glideslope scaling was revised in some aircraft thus causing possible Mode 5 nuisance alerts. Therefore the FMS has been removed as a valid source for Mode 5 alerting. This makes the Mode 5 glideslope/localizer source selection for these aircraft consistent with other ProLine 4 and ProLine 21 applications.
- The Mode 5 envelope floor has been raised from 30 feet to 50 feet to reduce possible nuisance alerts.
- New variant terrain displays have been added for Collins ProLine 21 IDS Display (Terrain Display ID 56 and 57). This enables business jet aircraft with the EGPWS to install a retrofit version of the ProLine 21.
- The chargeable optional functions or interfaces identified below have been added or revised to support the Honeywell SmartLanding and SmartRunway features:

Added the new stabilized approach monitor function. This function provides the flight crew with awareness of unstabilized approaches to help decrease the risk of runway excursions, long landings, and hard landings. This function is enabled through RCD loading, which can be specified at the time of purchase. In addition, the RCD enable program pin or the approach monitor enable input discrete can be used with the RCD to enable the function. The function provides aural messages for advisory and caution conditions and visual indications for the caution condition. This function can be inhibited via the RAAS inhibit input discrete or the approach monitor inhibit input discrete.

Added the new altimeter monitor function. This function provides the flight crew with awareness of an anomaly in the pressure altitude system when passing through the transition altitude. This function is enabled through RCD loading, which can be specified at the time of purchase. In addition, if desired, the RCD enable program pin, along with the RCD, can be used to enable the function. This function provides aural messages for these advisory conditions.

Added the new takeoff flap configuration monitor. This function provides the flight crew with advance notice (upon runway alignment) of an improper flap configuration. The function is enabled through RCD loading which can be specified at the time of purchase. In addition, if desired, the RCD enable program pin or RAAS enable input discrete, along with the RCD, can be used to enable the function. This function provides aural messages and visual indications for this caution condition. This function can be inhibited via the RAAS inhibit input discrete.

Added the long landing monitor. This function provides the flight crew with awareness that the aircraft has not touched down within a defined along-track distance from the runway threshold. It also provides flight crew awareness of a defined along-track distance from the end of the runway. This function is enabled through RCD loading, which can be specified at the time of purchase. In addition, the RCD enable program pin or RAAS enable input discrete can be used with the RCD to enable the function. The function provides aural messages and visual indications for this caution condition. This function can be inhibited via the RAAS inhibit input discrete.

New RAAS caution alerts have been added for taxiway landing, approaching short runway in air, insufficient runway on ground, and taxiway takeoff. These functions are enabled through RCD loading which can be specified at the time of purchase. In addition, the RCD enable program pin or RAAS enable input discrete can be used with the RCD to enable the function. Refer to the brief explanation below of each of the new RAAS alerts.

The taxiway landing function alerts the crew when the aircraft is not lined up with a valid runway at low altitudes. A separate voice gender selection exists for this function. This function provides aural messages and visual indications for this caution condition.

The approaching short runway caution - in air function is an addition to the existing approaching short runway - in air advisory. It provides a caution annunciation on final approach when the available length of the aligned runway may not be sufficient for normal landing. This function provides aural messages and visual indications for this caution condition.

The insufficient runway caution, on ground function is an addition to the existing insufficient runway length - on ground advisory. It provides a caution annunciation early in the takeoff roll when the runway length available may not be sufficient for normal takeoff operations. This function provides aural messages and visual indications for this caution condition.

The taxiway take-off caution uses the same algorithm as the existing taxiway take-off advisory algorithm. It provides a caution annunciation in lieu of an advisory annunciation for operators whose operational procedures treat this as a caution situation. This function provides aural messages and visual indications for this caution condition.

A new RAAS option has been added. The option includes a distance unit voice aural (feet or meters) to the first occurrence of the distance remaining and the runway end callouts (example “Four Thousand ***FEET*** remaining”). This function is enabled through RCD loading, which can be specified at the time of purchase.

The new capability has been added to display visual messages to accompany the aurals identified below. The visual message is a text annunciation via a terrain display overlay page that is on the center of the display (one line below where the RAAS status is viewed). This function is enabled through RCD loading, which can be specified at the time of purchase

- RAAS aurals
- Stabilized approach monitor aurals
- Altimeter monitor aurals
- Long landing monitor aurals
- Takeoff flap configuration monitor aurals
- Terrain database version

- The RAAS distance remaining logic has been revised to handle runways with a displaced threshold.
- RAAS inoperative (INOP) has been revised to be set true when the global positioning system (GPS) is faulted even when the EGPWS selected position source is not GPS.
- The RAAS not available logic has been revised to prevent spurious RAAS Not Available occurrences when flying at low altitudes past non-RAAS airports.
- The RAAS status behavior has been revised as follows.

For any non-working condition (INOP, not available, and inhibit):

- The status is displayed immediately and removed when a range change occurs.
- The status will be shown again for 2 sweeps for subsequent range changes.

For working conditions (normal and rejected takeoff):

- The status is displayed only when requested via a range change (for 2 sweeps).

The location of the RAAS status is also centered on the display to correct issues with the long text string being cut off of the viewable area on some aircraft types. This is only applicable to aircraft with RAAS enabled.

- The Aeronautical Radio, Inc. (ARINC) 429 output labels have been revised to support the new functions as follows:
 - The RAAS callout discrete output label 266 has been replaced with the unique voice identifier label 265. This replacement supports the expansion of new alert voices from the new functions.
 - The alert discrete output label 300 has been redefined. This redefinition supports the new approach monitor caution, takeoff flap configuration monitor, and deep landing monitor outputs.
 - The new discrete output label 056 has been added for the new taxiway takeoff caution and short runway caution alerts under the E-5 group.
- The present status has been updated to report RCD PART NUMBER instead of RAAS RCD PART NUMBER since the RCD contains more than just RAAS functions.

- The ST levels 1 and 3 have been revised to include mention of the new monitor functions.
- GPS altitude input processing has been revised from 1,000 milliseconds to 100 milliseconds to minimize potential lag in the altitude data. The input signal from the aircraft will remain at 1,000 milliseconds.
- The horizontal dilution of precision (HDOP) and vertical dilution of position (VDOP) signals have been added into the computation of the horizontal figure of merit (HFOM) to get the higher precision required by the RAAS. This fixes the problem on aircraft with the Honeywell HT-9100 GPS installed where the selective availability (SA) is set ON.
- An option to use the glideslope cancel input discrete as the RAAS inhibit input discrete when the aircraft is on the ground has been added. This option is enabled through RCD loading.
- The 1,000 feet and 500 feet altitude callout window has been widened from 20 feet to 50 feet to reduce the chance of a stabilized approach monitor aural alert masking the Mode 6 altitude callout aural.
- Possible Mode 1 nuisance alerts have been reduced by revising the data reasonableness check on the barometric altitude rate input signal. This causes data identified as unreasonable to be flagged when the radio altitude (RA) is at or below 60 feet. It also resets it to reasonable when RA is more than 95 feet.
- The 0.8 second time guard for the Mode 1 and Mode 5 caution/warning envelopes at power up has been removed to ensure the alert is transmitted as soon as possible when a power cycle occurs.
- The angle of attack (AOA) reasonableness test during takeoff roll has been revised to prevent false windshear (WS) fail indications.
- The potential terrain display problem has been fixed where the highest terrain is not selected when different resolution maps intersect.
- The option has been added to view the terrain database version on the terrain display while on the ground when requested via a range change (for 2 sweeps). Previously, the terrain database (TDB) version could only be seen during a self test (ST). This function is made to operate through the reloadable customer definitions (RCD) loading.
- Mod 1 to Application Software Version 230 and Configuration Software Version 230 implement the following changes:
 - (1) The reason for this modification is to make the Application Software Version -230-230/-054 SmartRunway and SmartLanding features compatible with MK V EGPWS Terrain Database Version 456 and later. Honeywell introduced the SmartRunway and SmartLanding features in the Application Software Version -230-230/-054 software. At the same time, Honeywell released Terrain Database Version 454 to support these new features as well as the existing EGPWS TAWS functionality in the existing EGPWS part numbers. However, during field usage Honeywell discovered an issue with Terrain Database Version 454 (and subsequently, Terrain Database Version 455). The issue resulted in some specific existing EGPWS part numbers occasionally resetting and going INOP for 20 seconds. In order to resolve this issue, Honeywell released Terrain Database Version 456 which corrected the reset issue associated with Terrain Database Versions 454 and 455 and the specific EGPWS part numbers. However, the change to Terrain Database Version 456 requires a modification to the -230-230/-054 part numbers in order for these part numbers to utilize Terrain Database Version 456 and the SmartRunway and SmartLanding features. Customers utilizing the -230-230/-054 part numbers can continue to utilize Terrain Database Versions 454 and 455. If they are not utilizing any SmartRunway and SmartLanding features, they can utilize Terrain Database Version 456 and later. However, if customers using the -230-230/-054 part numbers are utilizing any SmartRunway and SmartLanding features and they need to update to Terrain Database Version 456 or later they must update to software Mod 1.

965-0976-0xx-230-230 to 965-0976-0xx-232-232 – Service Bulletin D201002000016 (965-0976/1690-34-130)

965-0976-0xx-232-232 to 965-0976-0xx-232 Mod 1-232 Mod 1 – Service Bulletin D201003000045 (965-0976/1690-34-131)

- DELETED support for the following aircraft:

Fokker 100 (Aircraft Type 131) - This software release cannot be used by Fokker 100 operators.

- Revised the application software to use the new runway database format to support SmartRunway and SmartLanding functions.

Honeywell introduced the SmartRunway and SmartLanding features in the -230-230/-054 software release. During field usage, Honeywell discovered an issue with Terrain Database Version 454 (and subsequently 455) that resulted in some specific existing EGPWS part numbers occasionally resetting and going inoperative (INOP) for 20 seconds. To resolve this issue Honeywell released Terrain Database Version 456, which corrected the reset issue associated with Terrain Database Versions 454 and 455 and the specific EGPWS part numbers.

If SmartRunway and/or SmartLanding functions are activated, then Terrain Database Version 456 or subsequent must be used. This release incorporates a change to the application software to be compatible with Terrain Database Version 456 and subsequent.

- Aircraft type 33, EMB-145 - Added reference speed to support SmartLanding Stabilized Approach Monitor Excessive Speed (“Too Fast”) function.

965-0976-0xx-232-232 to 965-0976-0xx-234-234 – Service Bulletin D201011000001 (965-0976-XXX-34-131)

- Added a reference speed label to the FMC ARINC 429 buses for the aircraft types listed below to support excessive speed monitor function of SmartLanding.

Bombardier aircraft:

Aircraft Type 78 - Learjet Model 60/60XR
Aircraft Type 81 - Canadair CL- 601/3A, (SafeFlight AOA), Audio On
Aircraft Type 85 - Canadair CL- 601/3A, (Rosemont AOA), Audio On
Aircraft Type 97 - Canadair GEX
Aircraft Type 102 - Learjet Model 45
Aircraft Type 152 - DeHavilland Dash 8-400 with universal FMS/GPS
Aircraft Type 161 - Canadair CL-601/3A (SafeFlight AOA), traffic collision avoidance system (TCAS) Inhibit
Aircraft Type 165 - Canadair CL- 601/3A, (Rosemont AOA), TCAS Inhibit
Aircraft Type 166 - Learjet Model 45 (Integrated Display).

Cessna aircraft:

Aircraft Type 62 - Cessna Citation X.

Dassault aircraft:

Aircraft Type 70 - Falcon 20F
Aircraft Type 71 - Falcon 20F/IRS
Aircraft Type 75 - Falcon 900
Aircraft Type 82 - Falcon 50
Aircraft Type 93 - Falcon 900EX
Aircraft Type 126 - Falcon 50EX non-integrated
Aircraft Type 157 - Falcon 900EX no display.

Dornier aircraft:

Aircraft Type 35 - Dornier 328Jet
Aircraft Type 41 - Dornier 328 Turboprop.

Gulfstream aircraft:

Aircraft Type 68 – Gulfstream II
Aircraft Type 69 - Gulfstream IIB/III
Aircraft Type 79 - Gulfstream IV
Aircraft Type 87 - Gulfstream IV with dual IRS/ADC/RA
Aircraft Type 89 - Gulfstream G-200 (IAI Galaxy) Non-Integrated
Aircraft Type 90 - Gulfstream G-100 (IAI Astra SPX) Non-Integrated
Aircraft Type 96 - Gulfstream V
Aircraft Type 104 - Gulfstream V with 4 ILS.

Hawker Beechcraft aircraft:

Aircraft Type 66 - Hawker 800 (S: Honeywell [Sperry] display)
Aircraft Type 67 - Hawker 1000 (SafeFlight AOA)
Aircraft Type 138 - Hawker 800 (S: Honeywell [Sperry] Display/SafeFlight AOA).

- Added ARINC 429 flap angle label for the aircraft types listed below to support the takeoff flap configuration monitor function.

Bombardier aircraft:

Aircraft Type 34 - Challenger CL-300
Aircraft Type 43 - Canadair Regional Jet (RJ-100/RJ-200)
Aircraft Type 46 - Canadair Regional Jet (CRJ) Series 700.

- Added ARINC 429 DCU 1 and 2 buses and flap angle label to the aircraft type listed below to support the takeoff flap configuration monitor function.

Bombardier aircraft:

Aircraft Type 47 - Canadair Regional Jet (RJ-100/RJ-200) Integrated.