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Gulfstream G-IV

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RECORD OF REVISIONS

Revision Number	Sections	Pages	Date
Original	ALL	ALL	08/13/2013
1	Record of Revision, Highlights of Change, TOC, Appendix 8, Appendix 9	2, 3, 5, 6, 7, 8, 9, 10, 11, 18, 19, 21, 22, 23	06/19/2015
2	Record of Revision, Highlights of Change, TOC, Appendix 10, Appendix 11, Appendix 12	2, 3, 5, 24, 25, 26, 27, 28	08/25/2016

HIGHLIGHTS OF CHANGE

Revision 0: This is the original Gulfstream G-IV FSB Report.

Revision 1: Documented FSB evaluation of, and training/checking/currency requirements for Universal Avionics UL-800/801 Future Air Navigation System (FANS) 1/A+ Unilink Datalink Communications System (ST03422CH) as installed in the G-IV aircraft. This new information can be found in “Appendix 8”.

Documented FSB evaluation of, and training/checking/currency requirements for Universal Avionics UL-800/801 Future Air Navigation System (FANS) 1/A+ Unilink Datalink Communications System (ST03423CH) as installed in the G-IV aircraft. This new information can be found in “Appendix 9”.

Removed all references for G-1159C model designation in paragraphs 1.1, 1.2, 1.4, 2.1, 5.2.1, 5.2.2, 5.2.4, 6.2, 7, 8, 10, 11.1, 13.1, and 13.2. The Type Certificate Data Sheet (TCDS) was revised to redefine the model as “G-IV”.

Changed references from simulator to “full flight simulator” on pages 2, 3, 6, 8, 14, 15, 16, 17, and 18.

Page 6 Paragraph 1.7, Added acronym FFS and corrected acronym for FSTD.

Page 8 Paragraph 6.2, Corrected reference from 8900.10 to 8900.1. Changed “the approach should... to the approach must....”.

Page 9 Paragraph 10, Changed FSB SPECIFICATIONS FOR DEVICES AND SIMULATORS to FSB SPECIFICATIONS FOR FLIGHT SIMULATION TRAINING DEVICES.

Page 16 NOTE 1, Changed paragraph 7 to Appendix 4.

Page 16 NOTE 2, Changed 14 CFR § 91.175 (c) to 14 CFR § 91.175 (l). Changed “The flight visibility..... to “The enhanced flight visibility.....”.

Page 16, FSB SPECIFICATIONS FOR CHECKING; Removed reference for 121.441.

Page 17, Changed level 2-5 to level 4 or 5.

Revision 2

Page 25, added APPENDIX 10 – HONEYWELL MARK III COMMUNICATIONS MANAGEMENT UNIT (CMU) for FANS 1/A+ (ST-06-2014-0026)

Page 26, added APPENDIX 11 – G-IV Honeywell CD-830 Control Display Units (ST04037 AT-D)

Page 28, added APPENDIX 12 – G-IV Primus Elite Advanced Features (PEAF) Modification (STC04297 AT-D)

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1. PURPOSE AND APPLICABILITY

- 1.1 This report specifies master training, checking, and currency requirements applicable to crews operating G-IV aircraft under 14 CFR part 91, 125, and 135. Provisions of this report:
 - a) Identify the pilot “type rating” assigned to the G-IV,
 - b) Describe any unique requirement applicable to initial, differences or recurrent training,
 - c) Describe “Master Difference Requirements” for flight crews requiring differences qualification for mixed-fleet-flying or differences, if applicable,
 - d) Provide examples of Operator Difference Requirements (ODR) tables, if applicable,
 - e) Describe acceptable training program and training device characteristics when necessary to establish compliance with applicable regulations, and MDR tables, if applicable,
 - f) Identify checking and currency standards to be applied by the FAA or operators, and
 - g) Provide a listing of regulatory compliance status (compliance checklist) for 14 CFR part 91, 125, & 135, Advisory Circulars, and other operationally related criteria.
- 1.2 This report addresses G-IV aircraft as specified in FAA Type Certificate Data Sheet (TCDS) # A12EA.
- 1.3 The provisions of this Flight Standardization Board (FSB) report are effective until amended, superseded, or withdrawn by subsequent revisions to this report.
- 1.4 Determinations made in this report are based on the evaluations of a G-IV aircraft equipped in a production configuration and in accordance with current regulations and guidance. Modifications and differences made to the model described herein, or introduction of new related aircraft, may require amendment of the findings in this report. The FSB reserves responsibility/authority to re-evaluate and modify sections of this report based on new or revised Advisory Circular material or revisions to 14 CFR part 91, 125, and 135, aircraft operating experience, or the testing of new or modified aircraft under the provisions of AC 120-53 (as amended), Guidance for Conducting and Use of Flight Standardization Board Evaluations, as revised.
- 1.5 Terminology. The term “must” is used in this FSB report and certain MDR footnotes even though it is recognized that this report provides one acceptable means, but not necessarily the only means of compliance with 14 CFR part 91, 125, and 135 requirements. This terminology acknowledges the need for operators to fully comply with this FSB report and MDR and ODR provisions, if applicable, if AC 120-53 (as amended) is to be used by the operator as the means of complying with 14 CFR part 91, 125, and 135 requirements.

1.6 This report includes:

- a) Minimum training, checking, and currency requirements for FAA field offices to use for approving operator programs (e.g. MDRs, Type Rating designations),
- b) General advisory information which may be approved for that operator (e.g. MDR footnotes, ODR tables), and
- c) Information which is used to facilitate FAA review of an aircraft type or related aircraft that is proposed for use by an operator (e.g. compliance checklist).

1.7 Relevant acronyms are defined as follows:

AC	Advisory Circular
ACO	Aircraft Certification Office
AFM	Airplane Flight Manual
AP	Autopilot
CFR	Code of Federal Regulations
CHDO	Certificate Holding District Office
DC	Display Controller
EFIS	Electronic Flight Instrument System
EGPWS	Enhanced Ground Proximity Warning System
EICAS	Engine Indicating and Crew Alerting System
FADEC	Full Authority Digital Engine Control
FFS	Full Flight Simulator
FGS	Flight Guidance System
FMA	Flight Mode Annunciator
FMS	Flight Management System
FSB	Flight Standardization Board
FSTD	Flight Simulation Training Device
IRS	Inertial Reference System
ISDU	Inertial System Display Unit
LPV	Localizer Performance with Vertical Guidance
MMEL	Master Minimum Equipment List
MCDU	Multi-Function Control Display Units
MDR	Master Differences Requirements
MFF	Mixed Fleet Flying
ND	Navigation Display
ODR	Operator Differences Requirements
PFD	Primary Flight Display
POI	Principal Operations Inspector
QRH	Quick Reference Handbook
SBAS	Satellite Based Approach System
SG	Symbol Generator
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Alert and Collision Avoidance System
TCE	Training Center Evaluator

TCPM	Training Center Program Manager
VNAV	Vertical Navigation
WAAS	Wide Area Augmentation System
WOW	Weight on Wheels

2. PILOT “TYPE RATING” REQUIREMENTS

- 2.1 In accordance with the provisions of the 14 CFR part 61, FAA Order 8900.1, and AC 120-53 (as amended), a new pilot type rating is assigned to the GULFSTREAM G-IV aircraft and is designated “G-IV”.
- 2.2 In that this is a new pilot type rating, the FSB did not evaluate, and does not allow for any training credits, checking credits, currency credits, landing currency credits, or proving test credits (except that which is permitted by 14 CFR § 135.145) between the G-IV and any other similar type aircraft from Gulfstream.

3. “MASTER DIFFERENCE REQUIREMENTS” (MDR)

Reserved for future aircraft.

4. OPERATOR DIFFERENCE REQUIREMENTS (ODR) TABLES

Reserved for future related aircraft.

5. FSB SPECIFICATIONS FOR TRAINING

5.1 General

5.1.1 The provisions of this section apply to programs for airmen who have experience in multi-engine transport turbojet aircraft, EFIS, and FMS. Additional requirements may be appropriate for airmen not having this experience.

5.1.2 Reserved.

5.2 Pilots Initial Training

5.2.1 G-IV ground training is accomplished as specified by 14 CFR § 91.1101 (as applicable) or 135.345 and any Areas of Emphasis identified in paragraph 5.5.

5.2.2 G-IV flight training is accomplished as specified by 14 CFR § 91.1103 (as applicable) or 135.347 and any Areas of Emphasis identified in paragraph 5.5.

5.2.3 Emergency training is accomplished as specified by 14 CFR § 91.1083 (as applicable) or 135.331.

5.2.4 Seat Dependent Tasks training.

The FSB has not found any seat dependent tasks for the G-IV.

5.3 Differences Training (14 CFR § 135.347)

Reserved for future related aircraft.

5.4 Recurrent Training

5.4.1 Recurrent Ground Training must include appropriate training in accordance with 14 CFR § 91.1107 (as applicable) or 135.351 and any Areas of Emphasis in paragraph 5.5 if applicable.

5.4.2 Recurrent Flight Training must include appropriate training in accordance with 14 CFR § 91.1107 (as applicable) or 135.351 and any Areas of Emphasis in paragraph 5.5 if applicable.

5.5 Areas of Emphasis

5.5.1 No ground training areas of emphasis were found.

5.5.2 No flight training areas of emphasis were found.

5.6 Specific Flight Characteristics for Training. (See Section 6.2 for checking requirements).

- All items listed in paragraph 5.5.2

6. FSB SPECIFICATIONS FOR CHECKING

6.1 General

6.1.1 Checking must be conducted in accordance with 14 CFR part 61, Practical Test Standards and 14 CFR part 135, as applicable and Specific Flight Characteristics in paragraph 6.2.

6.2 Specific Flight Characteristics (Ref. FAA Practical Test Standards)

- **LANDING NO FLAP OR NON STANDARD FLAP APPROACH** – The FSB has determined that the probability of flap extension failure on the G-IV is not extremely remote due to system design. Therefore, demonstration of a no flap approach and landing during pilot certification a 14 CFR part 91 subpart K or a 14 CFR part 135 proficiency check is required. In accordance with FAA Order 8900.1, when the practical test is conducted in an airplane, versus a full flight simulator, touchdown from a no flap approach is not required and shall not be attempted. The approach must be flown to the point where the inspector or examiner can determine whether a touchdown at an acceptable point on the runway and a safe landing to a full-stop could be made.

7. FSB SPECIFICATIONS FOR CURRENCY

The FSB has found no additional currency requirements for the G-IV, other than those already specified in 14 CFR part 61 and 135.

8. FSB SPECIFICATIONS FOR RECENT EXPERIENCE

The FSB has found no additional “Recent Experience” requirements for the G-IV, other than those already specified in 14 CFR part 61 and 135.

9. AIRCRAFT REGULATORY COMPLIANCE CHECKLIST

9.1 Regulatory Compliance Checklist (see Appendix 3).

10. FSB SPECIFICATIONS FOR FLIGHT SIMULATION TRAINING DEVICES

The FSB has found no unique or specific flight simulation training device requirements for the G-IV.

11. APPLICATION OF FSB REPORT

11.1 All G-IV operators are subject to the recommendations of this report. This report becomes effective when given final approval by the FAA.

11.2 All FAA Approved Training Programs must incorporate the latest FAA Approved AFM Procedures, AFM checklists, manufacturer’s recommendations for training maneuvers and all recommendations of this report.

12. ALTERNATE MEANS OF COMPLIANCE

12.1 Alternate means of compliance to the requirements of this report must be approved by the FSB. If alternate compliance is sought, operators must show that the proposed alternate means provides an equivalent level of safety to the provisions of AC 120-53 (as amended) and this FSB report. Analysis, demonstrations, proof of concept testing, differences documentation or other evidence may be required.

12.2 Equivalent Safety - Significant restrictions may apply in the event alternate compliance is sought, and the reporting requirements may be increased to ensure equivalent safety. FAA will generally not consider relief through alternate compliance unless sufficient lead-time has been planned by an operator to allow for any necessary testing and evaluation.

12.3 Interim Programs - In the event of clearly unforeseen circumstances in which it is not possible for an operator to comply with provisions of this report, the operator may seek an interim program approval rather than a permanent alternate compliance method. Financial arrangements, scheduling adjustments and other such reasons are not

considered “unforeseen circumstances” for the purposes of this provision. Interim program approvals must be approved by the FSB Chairman.

13. MISCELLANEOUS

- 13.1 Landing Minima Categories, ref 14 CFR § 97.3. The G-IV is considered Category D aircraft for the purposes of determining “straight-in landing weather minima”.
- 13.2 Forward Observer Seat - The G-IV forward observer seat is part of the type certificated design. The FSB evaluated the Forward Observer Seat using the criteria in AC 120-83, Flight Deck Observer Seat and Associated Equipment, and found that it is operationally suitable for 14 CFR §§ 125.317(b) and 135.75(b).

APPENDIX 1

MASTER DIFFERENCE REQUIREMENTS (MDR) TABLE

This section reserved for future related aircraft.

APPENDIX 2

SAMPLE OPERATOR DIFFERENCE REQUIREMENTS (ODR) TABLES

This section is reserved for future related aircraft.

APPENDIX 3

AIRCRAFT REGULATORY COMPLIANCE CHECKLIST

Not Accomplished.

APPENDIX 4 – HEAD-UP DISPLAY (HUD) SYSTEM

The G-IV Flight Standardization Board (FSB) participated in three in-flight evaluations of the Honeywell 2020 HUD System during its development between December 1995 and September 1996, using Honeywell's CE-650 and G-IV aircraft. In March 1997, the FSB conducted certification flight tests, along with the Los Angeles Aircraft Certification Office (ACO), in Honeywell's G-IV aircraft. Flight testing consisted of approximately 40 HUD approaches at seven different airports, using CAT I and CAT II procedures, during day, night, Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). Additional evaluations were conducted in Honeywell's HUD simulation facility in Glendale, Arizona.

The FSB also evaluated Honeywell's proposed Gulfstream G-IV Airplane Flight Manual (AFM) Supplement for HUD Operations and Gulfstream's proposed HUD CAT II appendix to the G-IV AFM Supplement for Category II Operations. Honeywell made a number of FAA required changes to the HUD symbology and proposed AFM Supplements to obtain an FAA Supplemental Type Certificate (STC). Once these changes were made, the FSB found the HUD operationally acceptable for all phases of flight and for U.S. CAT I and CAT II operations.

FSB SPECIFICATIONS FOR TRAINING

Flight crewmember training must be accomplished using a level 'C' full flight simulator, with a daylight visual display, or a level 'D' full flight simulator. The FSB has determined that each pilot in command of an aircraft equipped with a HUD system should receive a minimum of 4 hours of ground school training followed by a minimum of 4 hours of full flight simulator training in the left seat of a level 'C', with a daylight visual display, or level 'D' full flight simulator. A HUD 2020 System equipped aircraft may also be used for in-flight training. In-flight training should consist of a minimum of 4 hours of flying in the left seat of the HUD 2020 System equipped aircraft. A person who progresses successfully through flight training, is recommended by an instructor, and successfully completes the appropriate HUD proficiency check by a person authorized by the Administrator, need not complete the recommended 4 hours of flight training.

The FSB recommends special training emphasis in the following areas:

Ground Training:

- 1) Crew coordination.
- 2) Crew briefings and callouts.
- 3) Duties of pilot flying and pilot monitoring.

Flight Training:

- 1) Use of caged, uncaged, and clear modes (especially in crosswind conditions).
- 2) Use of the pitch limit indicator (PLI) during windshear escape.
- 3) Approaches to 'black hole' airports using the FPA.
- 4) Use of the acceleration cue as a potential flight path angle (FPA).
- 5) Relationship of the glide path angle to the symbolic runway.
- 6) Use of the flare symbol as a cue (not as guidance) and approaches into the top of an undercast during daylight and night conditions.
- 7) Recovery from unusual attitudes.
- 8) TCAS resolution advisory.
- 9) Takeoff using the FPA to meet a required climb gradient.

FSB SPECIFICATIONS FOR CHECKING

Flight crewmember checking requires a proficiency check conducted in a level 'C' full flight simulator, with a daylight visual display, in a level 'D' full flight simulator, or on a HUD 2020 System equipped aircraft. The proficiency check will include at least one takeoff and departure procedure and one instrument approach and landing utilizing the HUD.

FSB SPECIFICATIONS FOR CURRENCY

None.

APPENDIX 5 – KOLLSMAN ENHANCED VISION SYSTEM (EVS)

In late 2002, certification flight tests were conducted on the G-IV EVS. Certification credit was given from the G-V EVS to the G-IV EVS because of the identical components they shared. The G-V FSB EVS evaluation follows: From February 1998 to August 2001, the G-V Flight Standardization Board (FSB) Chairman participated with the FAA Los Angeles Aircraft Certification Office in EVS development, proof of concept, and certification flight tests. Those flights included over 50 EVS approaches conducted at approximately 15 different airports during day, night, Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). Gulfstream's G-V EVS Airplane Flight Manual Supplement was evaluated and found acceptable during the certification flight tests. In September 2001, two G-V FSB members received EVS ground school, full flight simulator, and airplane training from Gulfstream Aerospace Corp. (GAC), in Savannah, GA. The FSB found EVS operationally acceptable.

Flight crewmember training must include a review of Title 14 CFR § 91.175 and a review of the Supplemental Type Certificate (STC) AFM supplement for the GAC STC for the installed EVS system.

Flight crewmember training must be accomplished using a level 'C' full flight simulator, with a daylight visual display, or a level 'D' full flight simulator that has been qualified by the National Simulator Program for EVS, or the aircraft. The FSB has determined that each pilot in command of an aircraft equipped with EVS should receive a minimum of 4 hours of ground school training followed by a minimum of 2 hours of full flight simulator training in the left seat of a level 'C', with a daylight visual display, or level 'D' full flight simulator. An EVS equipped G-IV aircraft may also be used in lieu of a full flight simulator for training. In-flight training should consist of a minimum of 2 hours of flying in the left seat of the EVS System equipped aircraft. The flight portion of the training should consist of a minimum of two (2) day and two (2) night approaches with vertical guidance.

The FSB recommends special training emphasis in the following areas:

Ground Training:

- 1) Transition from EVS imagery to non-EVS, visual conditions. Maximum use should be made of videotapes of actual EVS approaches.
- 2) Crew briefings and callouts.
- 3) Duties of pilot flying and pilot monitoring.
- 4) Crew coordination.
- 5) Visual anomalies such as "noise" and "blooming".
- 6) Importance of cross checking the HUD instrumentation presentations against the EVS visual scene presentation to enable the pilot to recognize malfunctions of the ground

based ILS equipment and improper presentation of elements in the visual scene during the approach.

Flight/Full flight simulator Training:

- 1) Transition from EVS imagery to non-EVS, visual conditions and runway acquisition.
- 2) Crew briefings and callouts.
- 3) Importance of the “design eye position” in acquiring the proper EVS image.
- 4) Use of on/off switch “clear” mode.
- 5) Precision and non-precision instrument approaches in both day and night conditions.
- 6) Use of caged and uncaged modes in crosswind conditions.

NOTE 1: These EVS requirements assume that a pilot entering an EVS training program is trained and proficient in the use of the Honeywell 2020 HUD in accordance with the requirements of Appendix 4 “HUD” of this report. If a pilot is not trained and proficient in the use of the Honeywell 2020 HUD, the HUD training required by paragraph Appendix 4” of this FSB Report may be accomplished concurrently with the provisions of these EVS training requirements.

NOTE 2: 14 CFR § 91.175 (1) states that a pilot may continue an approach below the authorized MDA or continue the approach below the authorized DH if subparagraphs (1), (2), and (3) are met. Subparagraph (1) states, in pertinent part, “The aircraft is continuously in a position from which a descent to a landing on the intended runway can be made....”. Subparagraph (2) states, in pertinent part, “The enhanced flight visibility is not less than the visibility prescribed in the standard instrument approach procedures being used”. Subparagraph (3) states, in pertinent part, “...at least one of the following visual references for the intended runway are distinctly visible and identifiable to the pilot using the enhanced flight vision system”. All three subparagraphs: (1), (2), and (3) must be met. EVS is certified to allow the pilot to use EVS imagery to see the visual references required by subparagraph (3). It is not certified or authorized and cannot be used to satisfy the flight visibility requirements of subparagraph (2). The pilot must determine flight visibility without the use of EVS imagery.

NOTE 3: The EVS is also certified for use as an aid during all phases of flight: taxi, takeoff, climb, cruise, descent and landing.

NOTE 4: At the time of writing of this FSB Report the FAA had initiated a Notice of Proposed Rulemaking to change 14 CFR § 91.175 and address EVS. This report may have to be modified if the rule is changed.

FSB SPECIFICATIONS FOR CHECKING

Checking requires a proficiency check conducted in a level 'C' full flight simulator, with a daylight visual display, in a level 'D' full flight simulator, that has been qualified by the National Simulator Program for EVS, or on an EVS equipped aircraft. The proficiency check will include at least one instrument approach to published minimums and landing utilizing the EVS. This check can be accomplished concurrently with a proficiency or competency check under 14 CFR §§ 61.57, 61.58, 91.1069, 135.293, or 135.297.

FSB SPECIFICATIONS FOR CURRENCY

If 14 CFR § 61.57 (c) is being used for currency, at least one of the six required instrument approaches must be accomplished using EVS to published minimums.

APPENDIX 6 – G-IV DISPLAY UNIT DU-885 MODIFICATION

The DU-885 modification changes the G-IV as follows:

- 1) Replaces six DU-880 cathode ray tubes (CRT) with six DU-885 liquid crystal displays (LCD).
- 2) Adds two Cursor Control Devices, an XM Weather receiver, and a data loader.
- 3) Adds the following functions:
 - a) Charts – Displays approach charts, airport maps, SIDs, STARs and noise procedures on the Enhanced Navigation Display (ND). Airplane position is also displayed on the charts that are geo-referenced.
 - b) Maps – Displays the FMS moving map over geopolitical boundaries augmented with navigational aids and XM weather on the ND.
 - c) Video – Displays multiple video inputs on the ND.
 - d) Database configuration – Displays database status on the ND and permits uploading charts and map data.
 - e) DU maintenance – Continuously tests the DU and displays a list of the failed tests on the ND (ground use maintenance function only).

Pilots transitioning from the DU-880 to the DU-885 system should be trained on the differences using any one of the following level “C” differences training devices: interactive computer based instruction, full flight simulators, cockpit procedures trainers, part task trainers, or level 4 or 5 flight training devices. There are no checking or currency requirements for this transition.

Level C differences training is the minimum training level required for G-IV with Display Unit DU-885 Modification equipped aircraft. When flight crews are assigned to the G-IV with Display Unit DU-885 Modification, operators and training providers must ensure that the level of training given is adequate for flight crews to fully understand the differences between these aircraft.

It should be noted that this report only addresses training, checking and currency for G-IV qualified pilots that are transitioning to the G-IV with Display Unit DU-885 Modification equipped aircraft. No training, checking, or currency determinations have been made for pilots transitioning from the G-IV with Display Unit DU-885 Modification equipped aircraft to the G-IV aircraft.

The Electronic Charts function is functionally equivalent to a Class 3 Electronic Flight Bag (EFB) with Type C software applications. For airplanes having the current terminal charts database loaded on the DU-885s and operable on both DU 2 and 5, no additional paper charts, class 1 or class 2 EFB are required.

APPENDIX 7 – HONEYWELL NZ-2000 FMS 6.1 SOFTWARE WITH SBAS/LPV GPS

In August 2012 and October 2012, the Gulfstream G-IV Flight Standardization Board (FSB) evaluated the Honeywell NZ-2000 FMS 6.1 Software with SBAS/LPV GPS, and found the installation to be operationally suitable.

BACKGROUND

The G-IV Flight Management System (FMS) provides lateral and vertical navigation data to the Auto Throttle (AT) system, Automatic Flight Control System (AFCS), and Electronic Display system (EDS). A GPS Landing System Sensor Unit (GLSSU) provides GPS position sensor data to the FMS, and ILS like guidance to the EDS and AFCS to provide Satellite Based Approach System (SBAS)/Localizer Performance with Vertical Guidance (LPV) approach capabilities. The change from a Global Navigation System Sensor Unit (GNSSU) to a GLSSU for the Gulfstream GIV aircraft, form the functional differences encompassed in Aircraft Service Change (ASC) 477, and adds the following functions:

- Addition of Cockpit LPV switch/annunciators.
- Software upgrade to NZ-2000 computers (NZ 6.1).
- GNSSU receivers and antennas upgraded to SBAS/LPV capable GLSSUs and antennas.
- Updated Magnetic Variation Tables.
- Vertical Navigation (VNAV) Temperature Compensation (Departure, Approach, and Missed Approach).
- En Route Vectored Operation.
- Vectors to Final (VTF) Approaches.
- FMS linked chart functionality(for DU-885 equipped aircraft only).
- Automated HA Leg Sequencing.
- Approach Procedures Support for Circling and Tactical Air Navigation (TACAN) approaches, and multiple Area Navigation (RNAV) approaches to the same runway (Multi-RNAV) Approaches).
- SBAS/LPV Operations, DO-229D, Class Delta-4 “ILS look alike”.
- Software enhancements to Lateral Guidance and flight planning for curved path calculations.

- Software enhancements to Path computation to reduce vertical splits.
- Software enhancements to system speed, quality and robustness.

Pilots transitioning to the Honeywell NZ-2000 FMS 6.1 Software with SBAS/LPV GPS should be trained on the differences using Level “C” training. Level C is interactive (full task) computer based instruction (ICBI). There are no checking or currency requirements for this transition.

**APPENDIX 8 – UNILINK UL-800/801FUTURE AIR NAVIGATION SYSTEM (FANS)
1/A+ UNILINK DATA LINK COMMUNICATIONS SYSTEM (ST03422CH)**

In January 2015, the G-IV Flight Standardization Board (FSB) participated in an evaluation of ST03422CH for the UNILINK UL-800/801FUTURE AIR NAVIGATION SYSTEM (FANS) 1/A+, UNILINK DATA LINK COMMUNICATIONS SYSTEM and found the installation to be operationally suitable.

The UniLink Future Air Navigation System (FANS) 1/A+ UNILINK DATA LINK COMMUNICATIONS SYSTEM implementation is intended to improve safety of flight, enhance efficiency, and increase air traffic capacity. Air traffic capacity increase is promoted by augmenting voice transmissions between crews and Air Traffic Control (ATC) with datalink messages during flight in oceanic and remote areas that have limited or no radar coverage. Features of this implementation include Air Traffic Services (ATS), Facilities Notification (AFN), Automatic Dependent Surveillance-Contract (ADS-C), and Controller-Pilot Datalink Communications (CPDLC) text data transmissions.

FANS 1/A + is principally composed of three applications:

- Controller-Pilot Datalink Communications (CPDLC) – CPDLC allows datalink messages to substitute for traditional voice communications for routine communications between a crew and an air traffic controller. CPDLC messages can be used to request and grant clearances, to inform the ground of the aircraft's position and situation, and to provide instructions to the crew.
- Air Traffic Services Facilities Notification (AFN) –AFN allows the aircraft and an ATS provider on the ground to exchange addresses, as well as information about which FANS applications they support.
- Automatic Dependent Surveillance-Contract (ADS-C) – This application requires no crew action. ADS-C allows ATS providers to query the aircraft to provide position reports and other situational data at regular intervals or in response to events specified by the ATS provider, such as a change in altitude or lateral deviation.

Future Air Navigation Systems (FANS)/RNP/ANP/CNS/CPDLC/ADS. Flight Crews operating aircraft equipped with FANS software should receive appropriate instruction in its general operational functions, appropriate uses for areas of operation, routes, or procedures to be flown. General training should address communications, navigation, and surveillance (CNS) functions covered by FANS, RNP, and ANP. In addition, sufficient training in use of data link communication and Automatic Dependent Surveillance (ADS) to ensure adequate knowledge, skill, and proficiency for flight crews to operate the above system(s) in typical daily operations (requiring their use) should be provided.

Specific Training - Pilots flying G-IV aircraft with the UNILINK UL-800/801FUTURE AIR NAVIGATION SYSTEM (FANS) 1/A+ UNILINK DATA LINK COMMUNICATIONS SYSTEM (ST03422CH) upgrade described above must undergo training in the areas defined below:

- FANS-1A and ATN CPLDC.
- LOG ON – LOG OFF.
- CLEARANCES.
- EMERGENCY.
- REQUEST.
- OFFSET.
- RPTS (reports) LIST.
- MESSAGE LOGS.
- FANS-1A and ATN CPLDC.
- POSITION REPORTING.
- ADS-C Contract.
- AIRPLANE FLIGHT MANUAL SUPPLEMENT.
- UNILINK UL-800/801FUTURE AIR NAVIGATION SYSTEM (FANS) 1/A+ UNILINK DATA LINK COMMUNICATIONS SYSTEM OPERATOR’S MANUAL.
- ADVISORY CIRCULAR AC 120-70 (as amended).

Special Emphasis Items:

Emphasis on data entry formats for FANS-1/A.

Emphasis on proper manual entry of ATC clearances into the source FMS.

Emphasis on data entry for Emergency Mayday, Pans and associated elements.

Training – Checking – Currency Levels

- a. The FSB determined that the minimum pilot training required, on the G-IV, for a pilot upgrade to the G-IV UNILINK UL-800/801FUTURE AIR NAVIGATION SYSTEM (FANS) 1/A+ UNILINK DATA LINK COMMUNICATIONS SYSTEM (ST03422CH) is level C. The minimum acceptable training method for level C training would be

interactive computer-based training, cockpit procedure trainers, or part task trainers (e.g., FMS or traffic collision avoidance system (TCAS)).

- b. Level A checking (no checking requirement) has been determined by the FSB.
- c. Level A currency (no currency requirement) has been determined by the FSB.

**APPENDIX 9 – UNILINK UL-800/801FUTURE AIR NAVIGATION SYSTEM (FANS)
1/A+ UNILINK DATA LINK COMMUNICATIONS SYSTEM (ST03423CH)**

In February 2015, the G-IV Flight Standardization Board (FSB) participated in an evaluation of ST03423CH for the UNILINK UL-800/801FUTURE AIR NAVIGATION SYSTEM (FANS) 1/A+, UNILINK DATA LINK COMMUNICATIONS SYSTEM and found the installation to be operationally suitable.

The UniLink Future Air Navigation System (FANS) 1/A+ UNILINK DATA LINK COMMUNICATIONS SYSTEM implementation is intended to improve safety of flight, enhance efficiency, and increase air traffic capacity. Air traffic capacity increase is promoted by augmenting voice transmissions between crews and Air Traffic Control (ATC) with datalink messages during flight in oceanic and remote areas that have limited or no radar coverage. Features of this implementation include Air Traffic Services (ATS), Facilities Notification (AFN), Automatic Dependent Surveillance-Contract (ADS-C), and Controller-Pilot Datalink Communications (CPDLC) text data transmissions

FANS 1/A + is principally composed of three applications:

- Controller-Pilot Datalink Communications (CPDLC) – CPDLC allows datalink messages to substitute for traditional voice communications for routine communications between a crew and an air traffic controller. CPDLC messages can be used to request and grant clearances, to inform the ground of the aircraft’s position and situation, and to provide instructions to the crew.
- Air Traffic Services Facilities Notification (AFN) –AFN allows the aircraft and an ATS provider on the ground to exchange addresses, as well as information about which FANS applications they support.
- Automatic Dependent Surveillance-Contract (ADS-C) – This application requires no crew action. ADS-C allows ATS providers to query the aircraft to provide position reports and other situational data at regular intervals or in response to events specified by the ATS provider, such as a change in altitude or lateral deviation.

Future Air Navigation Systems (FANS)/RNP/ANP/CNS/CPDLC/ADS. Flight Crews operating aircraft equipped with FANS software should receive appropriate instruction in its general operational functions, appropriate uses for areas of operation, routes, or procedures to be flown. General training should address communications, navigation, and surveillance (CNS) functions covered by FANS, RNP, and ANP. In addition, sufficient training in use of data link communication and Automatic Dependent Surveillance (ADS) to ensure adequate knowledge, skill, and proficiency for flight crews to operate the above system(s) in typical daily operations (requiring their use) should be provided.

Specific Training - Pilots flying G-IV aircraft with the UNILINK UL-800/801FUTURE AIR NAVIGATION SYSTEM (FANS) 1/A+ UNILINK DATA LINK COMMUNICATIONS SYSTEM (ST03423CH) upgrade described above must undergo training in the areas defined below:

- FANS-1A and ATN CPLDC.
- LOG ON – LOG OFF.
- CLEARANCES.
- EMERGENCY.
- REQUEST.
- OFFSET.
- RPTS (reports) LIST.
- MESSAGE LOGS.
- FANS-1A and ATN CPLDC.
- POSITION REPORTING.
- ADS-C Contract.
- AIRPLANE FLIGHT MANUAL SUPPLEMENT.
- UNILINK UL-800/801FUTURE AIR NAVIGATION SYSTEM (FANS) 1/A+ UNILINK DATA LINK COMMUNICATIONS SYSTEM OPERATOR’S MANUAL.
- ADVISORY CIRCULAR AC 120-70 (as amended).

Special Emphasis Items:

Emphasis on data entry formats for FANS-1/A.

Emphasis on proper manual entry of ATC clearances into the source FMS.

Emphasis on data entry for Emergency Mayday, Pans and associated elements.

Training – Checking – Currency Levels

- a. The FSB determined that the minimum pilot training required, on the G-IV, for a pilot upgrade to the G-IV UNILINK UL-800/801FUTURE AIR NAVIGATION SYSTEM (FANS) 1/A+ UNILINK DATA LINK COMMUNICATIONS SYSTEM (ST03423C) is level C. The minimum acceptable training method for level C training would be

interactive computer-based training, cockpit procedure trainers, or part task trainers (e.g., FMS or traffic collision avoidance system (TCAS)).

- b. Level A checking (no checking requirement) has been determined by the FSB.
- c. Level A currency (no currency requirement) has been determined by the FSB.

APPENDIX 10 – HONEYWELL MARK III COMMUNICATIONS MANAGEMENT UNIT (CMU) for FANS 1/A+ (ST-06-2014-0026)

On September 3, 2015, the G-IV FSB conducted an evaluation of the HONEYWELL MARK III COMMUNICATIONS MANAGEMENT UNIT (CMU) for FANS 1/A+ ST-06-2014-0026 and found it to be operationally suitable.

Specific Training - Pilots flying G-IV aircraft equipped with the HONEYWELL MARK III COMMUNICATIONS MANAGEMENT UNIT (CMU) for FANS 1/A+ ST-06-2014-0026 must undergo training in the areas defined below:

- FANS-1A and ATN CPLDC.
- LOG ON – LOG OFF.
- CLEARANCES.
- EMERGENCY.
- REQUEST.
- OFFSET.
- RPTS (reports) LIST.
- MESSAGE LOGS.
- FANS-1A and ATN CPLDC.
- POSITION REPORTING.
- ADS-C Contract.
- AIRPLANE FLIGHT MANUAL SUPPLEMENT.
- Pilot's Guide-Mark III Communications Management Unit (CMU) with Control Display Unit (CDU) for Legacy Systems (Including NZ 6.1 FANS).
- ADVISORY CIRCULAR AC 120-70 (as amended).

Special Emphasis Items:

Emphasis on data entry formats for FANS-1/A.

Emphasis on proper manual entry of ATC clearances into the source FMS.

Emphasis on data entry for Emergency Mayday, Pans and associated elements.

Training – Checking – Currency Levels

- a. The LGB AEG determined that the minimum pilot training required, on the G-IV, for a pilot upgrade to the HONEYWELL MARK III COMMUNICATIONS MANAGEMENT UNIT (CMU) for FANS 1/A+ (ST-06-2014-0026) is level C. The minimum acceptable training method for level C training would be interactive computer-based training, cockpit procedure trainers, or part task trainers.
- b. The minimum checking requirement is Level A (no checking requirement).
- c. The minimum currency requirement is Level A (no currency requirement).

APPENDIX 11 – G-IV Honeywell CD-830 Control Display Units (ST04037 AT-D)

On February 19, 2016, the G-IV Flight Standardization Board (FSB) participated in an evaluation of the G-IV Honeywell CD-830 Control Display Units Modification for (ST04037 AT-D) and found it to be operationally suitable.

The CD-830 is functionally similar to previously certified CDUs (CD-810, CD-820) with the exception of the replacement of various mechanical pushbutton keys with touchscreen targets and line selections on the CD-830 display. The following changes with the pilot interface have occurred to accommodate a larger screen:

- All line select hard keys will be moved onto the display as touchscreen buttons.
- All mode keys (PERF, NAV, FPL, PROG, DIR) will be moved from beneath the display to above the display.
- A new MENU mode key will be added above the display. The CD-820 VIDEO and GRAPHIC mode keys will be moved to line selections in the new MENU mode.
- The new MENU mode will add a Clean Touchscreen (CLEAN TS) line select key which freezes the touchscreen display for cleaning.
- The CD-820 BACK and function (FN) hard keys will now appear as touchscreen buttons on the display.
- PREV / NEXT keys will be moved to right side of the keyboard and their orientation changed to top and bottom relationship. The BRT / DIM keys will be re-located beneath the PREV / NEXT keys and their orientation changed to a side-by-side relationship.
- Airshow video control functions may be accomplished through RTN / ENTER touchscreen buttons at the lower corners of the display.
- The CD-810 / CD-820 DSPLY annunciation will no longer be displayed as it was a carryover from the CD-800 monochrome display.
- The CD-820 MSG annunciation will now annunciate as FMS MSG when the FMS has issued a message to the scratchpad.

The CD-830 is not intermixable with either the CD-810 or CD-820.

Special Emphasis Items:

None.

Training – Checking – Currency Levels

- a. The G-IV FSB has determined that the minimum pilot training required on the G-IV for a pilot upgrade to the HONEYWELL CD-830 Control Display Unit (ST04037 AT-D) is level A. The minimum acceptable training method for level A training would be achieved by issuance and familiarity with Operating Manual and Airplane Flight Manual Supplement.
- b. The minimum checking requirement is Level A (no checking requirement).
- c. The minimum currency requirement is Level A (no currency requirement).

**APPENDIX 12 – G-IV Primus Elite Advanced Features (PEAF) Modification
(STC04297 AT-D)**

On March 15, 2016, the G-IV Flight Standardization Board (FSB) participated in an evaluation of the G-IV Primus Elite Advanced Features (PEAF) Modification for STC04297 AT-D and found it to be operationally suitable. DU 885 PEAf includes the addition of Synthetic Vision System (SVS). SVS depicts terrain, obstacles and airports with texture and colors on the Primary Flight Display. It obtains the data from the TAWS database.

The DU-885 Primus Elite Advanced Features (PEAF) modification adds the following features to the G-IV DU-885 as follows:

- Primary Flight Display (PFD) with Synthetic Vision System (SVS).
- TCAS added to the Enhanced Map.
- XM Satellite Weather added METAR and TAF features.
- Improved Database loading via the DL-100.
- Added additional maintenance pages.

Special Emphasis Items:

Airspeed Tape is reversed on G-IV SV PFD.

Training – Checking – Currency Levels

- a. The G-IV FSB has determined that the minimum pilot training required on the G-IV for a pilot transitioning from the DU-880 or DU-885 to the G-IV Primus Elite Advanced Features (PEAF) Modification DU-885(STC04297 AT-D) is level C. The minimum acceptable training method for level C training would be interactive computer-based training, cockpit procedure trainers, or part task trainers. Gulfstream DU-885 Primus Elite Advanced Features (PEAF) Level C Training has been found to be acceptable.
- b. The minimum checking requirement is Level A (no checking requirement).
- c. The minimum currency requirement is Level A (no currency requirement).

It should be noted that this report only addresses training, checking and currency for G-IV qualified pilots that are transitioning to the G-IV with Display Unit DU-885 PEAf modification equipped aircraft. No training, checking or currency determinations have been made for pilots transitioning from the G-IV with Display Unit DU-885 PEAf Modification equipped aircraft to the G-IV aircraft.