U.S. Department of Transportation
Federal Aviation Administration
Washington, DC

Flight Standardization Board Report

Revision: 15
Date: XX/XX/XXXX

Manufacturer
Gulfstream Aerospace Corporation

Type Certificate Data Sheet (TCDS)	TCDS Identifier	Marketing Name	Pilot Type Rating
A12EA	GIV-X	G350/G450	G-V
A12EA	GV	GV	G-V
A12EA	GV-SP	G500-5000/G550	G-V

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2	Appendix 6	06/03/2002
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2. INTRODUCTION

Aircraft Evaluation Groups (AEG) are responsible for working with aircraft manufacturers and modifiers, during the development and Federal Aviation Administration (FAA) certification of new and modified aircraft to determine:

1) The pilot type rating,
2) Flightcrew member training, checking, and currency requirements, and
3) Operational suitability.

This report lists those determinations for use by:

1) FAA employees who approve training programs,
2) FAA employees and designees who certify airmen, and
3) Aircraft operators and training providers, to assist them in developing their flightcrew member training, checking, and currency.

3. HIGHLIGHTS OF CHANGE

The purpose of this revision is to add Appendix 17, VisionSafe Emergency Vision Assurance System (EVAS) SA1751LA-T for the GV-SP (G550) Aircraft, update Section 10.3, Seat-Dependent Tasks and update the language in Appendix 5.

4. BACKGROUND

The Transport Aircraft Long Beach AEG formed a Flight Standardization Board (FSB) that evaluated the Gulfstream G-V as defined in FAA Type Certificate Data Sheet (TCDS) No. A12EA. The evaluation was conducted during August thru September 1996 and January thru February 1996 using the methods described in FAA Advisory Circular (AC) 120-53, Crew Qualification and Pilot Type Rating Requirements for Transport Category Aircraft Operated Under FAR Part 121.

In September thru November 1997, the FSB conducted flight evaluations of the Honeywell Head-Up Display (HUD) Model 2020 and Category (CAT) II operations. It, as well as the associated Airplane Flight Manual (AFM) change, was found to be operationally suitable. Training, checking, and currency requirements are listed in Appendix 4, Head-Up Display (HUD) Systems.

In February 1998 thru September 2001, the FSB conducted flight evaluations of the Enhanced Vision System (EVS). It, as well as the associated AFM change was found to be operationally suitable. Enhanced Flight Vision System (EFVS) training and checking requirements are listed in Appendix 5, Enhanced Flight Vision System (EFVS) Operations.

In January and February 2003, the FSB conducted flight evaluations of the GV-SP. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 3, Differences Tables.

In March thru May 2004, the FSB conducted flight evaluations of the GIV-X. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 3.

In June 2005, the FSB conducted flight evaluations of the GV-SP CAT II capability. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 3.

In August 2005, the FSB conducted flight evaluations of PlaneView Avionics Software Version “C” in a GIV-X. This software added features such as charts, graphical flight planning, uplinked weather, video, an enhanced envelope protection system, and vertical situation display with terrain. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 6, Planeview Avionics Software Version “C.”

In February 2007, the FSB conducted flight evaluations of PlaneView Avionics Software Version “D” in a GV-SP. This software added flight management system (FMS) features, such as Vertical Glidepath (VGP), Required Navigation Performance (RNP)-Special Aircraft and Aircrew Authorization Required (SAAAR), performance step climb, takeoff obstacle clearance calculations, and graphical radio tuning. It also added the Runway Awareness Advisory System (RAAS). It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 7, Planeview Avionics Software Version “D.”

In April and November 2007, the FSB conducted flight evaluations of PlaneView Avionics Software Version "E" in a GIV-X. This software added Synthetic Vision Primary Flight Display (SV PFD). It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 8, Planeview Avionics Software Version "E."

In November and December 2007, the FSB conducted flight evaluations of the second generation (EVS II). It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 5.

In June 2009, the FSB conducted flight evaluations of PlaneView Avionics Software Version "F" in a GIV-X. This software added map functionality and three other options for operators to purchase: 1) enhanced navigation; 2) enhanced SV PFD; and 3) Satellite Radio (XM) Weather. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 9, Planeview Avionics Software Version "F."

In June 2009, the FSB conducted flight evaluations of Rockwell Collins Head-Up Guidance System Model 6250 (HUD II). It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 4.

In April 2011, the FSB conducted flight evaluations of PlaneView Avionics Software Version "G" in a GIV-X. This software added the following features: early missed approach activation with the multifunction control display units (MCDU) and takeoff/go-around (TOGA), localizer performance with vertical guidance (LPV) approach capture from above, maximum descent angle improvements, data link recording on the cockpit voice recorder (CVR), path-based Traffic Alert and Collision Avoidance System (TCAS) guidance on the SV PFD, listing of multiple localizer approaches to the same runway, and update to fuel tank temperature Crew Alert System (CAS) message and related synoptics for the GIV-X only. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 10, Planeview Avionics Software Version "G."

In November 2011, the FSB conducted flight evaluations of the DU-885 modification. This modification includes: 1) replacement of six Honeywell DU-880 cathode ray tubes (CRT) with six Honeywell Primus Elite DU-885 (liquid crystal display) (LCDs); 2) installation of two cursor control device (CCDs); and 3) new associated functions. The functions include: charts, maps, video, database, and DU maintenance. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 11, Display Unit (DU)-885 Modification.

In August thru October 2012, the FSB conducted flight evaluations of the Honeywell NZ-2000 FMS 6.1 Software with Satellite-Based Augmentation System (SBAS)/LPV Global Positioning Satellite (GPS). It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 12, Honeywell NZ-2000 FMS 6.1 Software.

In September 2015, the FSB conducted flight evaluations of the Honeywell Mark III Communications Management Unit (CMU) for Future Air Navigation System (FANS) 1/A+. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 13, Honeywell Mark III Communications Management Unit (CMU) for Future Air Navigation System (FANS) 1/A+.

In February 2016, the FSB conducted flight evaluations of the Honeywell CD-830 control display units (CDU) modification for STC No. ST04037AT-D. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 14, Honeywell CD-830 Control Display Units (CDU).

In March 2016, the FSB conducted flight evaluations of the Primus Elite Advanced Features (PEAF) modification for STC No. ST04297AT-D It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 15, Primus Elite Advanced Features (PEAF) Modification.

In March 2018, the FSB conducted flight evaluations of the Honeywell DU-1310-2 STC No. ST02672LA, which incorporates touchscreen functionality. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 16, Honeywell Display Unit (DU)-1310-2.

In September 2022, the FSB conducted an evaluation of the VisionSafe Emergency Vision Assurance System (EVAS). It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 17, VisionSafe Emergency Vision Assurance System (EVAS) SA1751LA-T for the GV-SSP (G550) Aircraft.

5. ACRONYMS

- 14 CFR Title 14 of the Code of Federal Regulations
- AC Advisory Circular
- ACARS Aircraft Communications Addressing and Reporting System
- ACFT Aircraft
- ACS Airman Certification Standards
- ADS-C Automatic Dependent Surveillance-Contract
- AEG Aircraft Evaluation Group
- AFCS Automatic Flight Control System
- AFM Airplane Flight Manual
- AFMS Airplane Flight Manual Supplement
- AGM Advanced Graphics Module
- AP Autopilot
- APU Auxiliary Power Unit
- ASC Aircraft Service Change
- AT Autothrottle
- ATC Air Traffic Control
- ATN Aeronautical Telecommunications Network

- ATP Airline Transport Pilot
- AUX Auxiliary
- AV Audiovisual Presentation
- CAS Crew Alert System
- CAT Category
- CCD Cursor Control Device
- CDU Control Display Unit
- CMF Communication Management Function
- CMU Communications Management Unit
- CPDLC Controller-Pilot Data Link Communications
- CPT Cockpit Procedures Trainer
- CRT Cathode Ray Tube
- CVR Cockpit Voice Recorder
- DAU Data Acquisition Unit
- DC Display Controller
- DMU Data Management Unit
- DU Display Unit
- EDM Emergency Descent Maneuver
- EDS Electronic Display System
- EEC Emergency Evacuation Crewmember
- EFB Electronic Flight Bag
- EFIS Electronic Flight Instrument System
- EFVS Enhanced Flight Vision System
- EGPWS Enhanced Ground Proximity Warning System
- EICAS Engine Indicating and Crew Alerting System
- EPU Estimated Position Uncertainty
- EVAS Emergency Vision Assurance System
- EVS II Second Generation Enhanced Vision System
- EVS Enhanced Vision System
- FAA Federal Aviation Administration
- FADEC Full-Authority Digital Engine Control
- FANS Future Air Navigation System
- FFS Full Flight Simulator
- FGS Flight Guidance System
- FMA Flight Mode Annunciator
- FMS Flight Management System
- FPA Flight Path Angle
- FPV Flight Path Vector
- FSB Flight Standardization Board
- FSBR Flight Standardization Board Report
- FSTD Flight Simulation Training Device
- FTD Flight Training Device
- FWC Fault Warning Computer
- GAC Gulfstream Aerospace Corporation

- GLSSU GPS Landing System Sensor Unit
- GNSSU Global Navigation System Sensor Unit
- GPS Global Positioning Satellite
- HA hold to altitude
- HGS Head-Up Guidance System
- HO Handout
- HSI Horizontal Situation Indicator
- HUD II Rockwell Collins Head-Up Guidance System Model 6250
- HUD Head-Up Display
- ICBI Interactive Computer-Based Instruction
- ILS Instrument Landing System
- IMC Instrument Meteorological Conditions
- IR Infrared
- IRS Inertial Reference System
- ITF Integration Test Facility
- IVU Inflatable Vision Unit
- LAN Local Area Network
- LCD Liquid Crystal Display
- LDI Lateral Deviation Indicator
- LNAV Lateral Navigation
- LOFT Line-Oriented Flight Training
- LPV Localizer Performance with Vertical Guidance
- LRN Long-Range Navigation
- MAU Modular Avionics Unit
- MCDU Multifunction Control Display Unit
- MDR Master Differences Requirements
- METAR Aviation Routine Weather Report
- MFF Mixed Fleet Flying
- MLW Maximum Landing Weight
- MTOW Maximum Takeoff Weight
- NAS National Airspace System
- NAVAID Navigational Aid
- ND Navigation Display
- NEXRAD Next Generation Weather Radar
- NWS Nosewheel Steering
- OEI One-Engine-Inoperative
- OMS Operating Manual Supplement
- PCMCIA Personal Computer Memory Card International Association
- PDB Power Distribution Box
- PEAF Primus Elite Advanced Features
- PF Pilot Flying
- PFD Primary Flight Display
- PIC Pilot in Command
- PLI Pitch Limit Indicator

- PM Pilot Monitoring
- PTT Part Task Trainer
- QRH Quick Reference Handbook
- RAAS Runway Awareness Advisory System
- RFMU Radio Frequency Management Unit
- RNAV Area Navigation
- RNP Required Navigation Performance
- RTO Rejected Takeoff
- SAAAR Special Aircraft and Aircrew Authorization Required
- SBAS Satellite-Based Augmentation System
- SID Standard Instrument Departure
- STAR Standard Terminal Arrival
- STC Supplemental Type Certificate
- SU Stand-Up Instruction
- SV PFD Synthetic Vision Primary Flight Display
- SVS Synthetic Vision System
- TACAN Tactical Air Navigation
- TAF Terminal Area Forecast
- TAWS Terrain Awareness and Warning System
- TC Type Certificate
- TCAS Traffic Alert and Collision Avoidance System
- TCBI Tutorial Computer-Based Instruction
- TCDS Type Certificate Data Sheet
- TOGA Takeoff/Go-Around
- V1 Takeoff Decision Speed
- VGP Vertical Glidepath
- VGS Visual Guidance System
- VMC Visual Meteorological Conditions
- VNAV Vertical Navigation
- V_{S0} Stalling Speed or the Minimum Steady Flight Speed in the Landing Configuration
- VTF Vectors to Final
- WOW Weight on Wheels
- WX Weather Radar
- XM Satellite Radio

6. DEFINITIONS

These definitions are for the purposes of this report only.

6.1 Base Aircraft. An aircraft identified for use as a reference to compare differences with another aircraft.

6.2 Current. A crewmember meets all requirements to operate the aircraft under the applicable operating part.

6.3 Differences Tables. Describe the differences between a pair of related aircraft, and the minimum levels operators must use to conduct differences training and checking of flightcrew members. Differences levels range from A to E.

6.4 Master Differences Requirements (MDR). Specifies the minimum levels of training and checking required between a pair of related aircraft, derived from the highest level in the Differences Tables.

6.5 Mixed Fleet Flying (MFF). The operation of a base aircraft and one or more related aircraft for which credit may be taken for training, checking, and currency events.

6.6 Operational Evaluation. The AEG process to determine pilot type rating, minimum flightcrew member training, checking and currency requirements, and unique or special airman certification requirements (e.g., specific flight characteristics, no-flap landing).

6.7 Operational Suitability. The AEG determination that an aircraft or system may be used in the National Airspace System (NAS) and meets the applicable operational regulations (e.g., 14 CFR parts 91, 121, 133, and 135).

6.8 Qualified. A flightcrew member holds the appropriate airman certificate and ratings as required by the applicable operating part.

6.9 Related Aircraft. Any two or more aircraft of the same make with either the same or different type certificates (TC) that have been demonstrated and determined by the Administrator to have commonality.

6.10 Seat-Dependent Tasks. Maneuvers or procedures using controls that are accessible or operable from only one flightcrew member seat.

6.11 Special Emphasis Area. A training requirement unique to the aircraft, based on a system, procedure, or maneuver, which requires additional highlighting during training. It may also require additional training time, specialized flight simulation training devices (FSTD), or training equipment.

6.12 Specific Flight Characteristics. A maneuver or procedure with unique handling or performance characteristics that the FSB has determined must be checked.

7. PILOT TYPE RATING

7.1 Type Rating. The Gulfstream Aerospace Corporation (GAC) GIV-X, GV, and the GV-SP type rating designation is G-V.

7.1.1 The Gulfstream GIV-X, GV, and GV-SP have not been issued a new TCDS. They were all added to the existing G-II through G-IV TCDS issued by the responsible Aircraft Certification Service office. However, the GIV-X, GV, and GV-SP aircraft are not considered variations or derivatives of the GAC G-IV aircraft for pilot type rating purposes. The FSB did not conduct a comparison between the G-IV and any other model aircraft for pilot type rating purposes.

Therefore, no credit may be given between the G-IV and any other model aircraft for training, checking, or currency.

7.2 Common Type Ratings. Not applicable.

7.3 Military Equivalent Designations. Military aircraft that qualify for the G-V type rating can be found at www.faa.gov under "Licenses & Certificates," "Airmen Certification," "Online Services," "Aircraft Type Rating Designators." This webpage is kept up-to-date and can be found at https://www.faa.gov/licenses_certificates/airmen_certification/.

8. RELATED AIRCRAFT

8.1 Related Aircraft on Same TCDS.

8.1.1 The GV is related to the GIV-X.

8.1.1.1 The GIV-X may be modified by GAC through Aircraft Service Changes (ASC) to be identified as either a "G450" (ASC 005) or a "G350" (ASC 004). The G450 ASC is simply a change of the aircraft data plate. The G350 ASC changes the data plate, reduces the amount of fuel the aircraft will carry, and makes the Visual Guidance System (VGS) HUD and EVS optional equipment.

8.1.1.2 The GIV-X is essentially a G-IV airframe with a GV-SP cockpit. It has a Honeywell Primus Epic avionics suite, which consists of four multifunction, 14-inch flat panel LCD units, two cockpit side-mounted CCDs, triple MC-850 MCDUs, VGS, EVS, Tay 611-8C full-authority digital engine control (FADEC) engines, a Honeywell 36-150 auxiliary power unit (APU), a cockpit observer's seat, and drag reduction modifications on the airframe. The flight control hydraulic boost ratios have been modified to replicate the handling characteristics of the GV and GV-SP.

8.1.2 The GV is related to the GV-SP.

8.1.2.1 The GV-SP may be modified by GAC through ASCs to be identified as either a "G550" (ASC 011) or a "G500-5000" (ASC 010). The G550 ASC is simply a change of the aircraft data plate. The G500-5000 ASC changes the data plate and reduces the amount of fuel the aircraft will carry, and makes the VGS HUD and EVS optional equipment.

8.1.2.2 Major changes from the GV to the GV-SP are the addition of a Honeywell Primus Epic avionics suite, which consists of four multifunction, 14-inch flat panel LCD units, two cockpit side-mounted CCDs, triple MC-850 MCDUs, main entry door relocation approximately 2-feet forward, additional seventh cabin window, new cockpit observer's seat, drag reduction modifications on the airframe, increased engine thrust, and a 500-lb increase in maximum ramp and takeoff weights.

8.1.3 The GIV-X is related to the GV-SP.

8.1.3.1 The GIV-X is essentially a G-IV airframe with a GV-SP cockpit. It has a Honeywell Primus Epic avionics suite, which consists of four multifunction, 14-inch flat panel LCD units, two cockpit side-mounted CCDs, triple MC-850 MCDUs, VGS, EVS, Tay 611-8C full-authority digital engine control (FADEC) engines, a Honeywell 36-150 auxiliary power unit (APU), a cockpit observer's seat, and drag reduction modifications on the airframe. The flight control hydraulic boost ratios have been modified to replicate the handling characteristics of the GV and GV-SP.

8.2 Related Aircraft on Different TCDS. Not applicable.

9. PILOT TRAINING

9.1 Airman Experience.

9.1.1 Pilots receiving initial GIV-X, GV, or GV-SP training should have previous experience in parts 91 or 135 air carrier operations, multiengine turbojet or turboprop aircraft, new generation avionics, high-altitude operations, military, and FMS experience. Pilots without this experience may require additional training.

9.1.2 Pilots receiving differences or upgrade GIV-X, GV, or GV-SP training are assumed to have previous experience in GIV-X, GV, or GV-SP, multiengine transport turbojet aircraft, new generation avionics, high-altitude operations, military, and FMS experience. Pilots without this experience may require additional training.

9.2 Special Emphasis Areas.

9.2.1 Pilots must receive special emphasis on the following areas during ground training:

a) Flight guidance system (FGS) (initial and transition training). The FSB found that early exposure to the FGS is important, especially for pilots with no previous electronic flight instrument system (EFIS) or FMS experience. Establishing early confidence in manually flying the aircraft, converting from manual to automatic (FMS-controlled) flight mode and back, is equally important due to heavy reliance on the FGS. Crew awareness and understanding of the flight mode(s) annunciated on the Flight Mode Annunciator (FMA) is important during all phases of flight.
b) Primary flight display (PFD) mode annunciators (initial, recurrent, upgrade and transition training).
c) Display controllers (DC) (initial, recurrent, upgrade and transition training).
d) Enhanced ground proximity warning system (EGPWS) (initial, recurrent, upgrade and transition training).

e) FMS (initial and transition training). The FSB found that early exposure to the FMS is important, especially for pilots with no previous electronic flight instrument system (EFIS) or FMS experience. Flightcrews must be able to convert from automatic (FMS-controlled) to manual mode and back in the event of a flightpath deviation due to input error or system malfunction.
f) TCAS (initial, recurrent, upgrade and transition training).
g) Automatic mode of wing and cowl anti-ice systems (initial, recurrent, upgrade and transition training).
h) HUD (initial, recurrent, upgrade and transition training) (see Appendix 4).
i) EVS/EFVS operations (initial, recurrent, upgrade and transition training) (see Appendix 5).
j) PlaneView System (GIV-X and GV-SP) (initial, recurrent, upgrade, differences and transition training).
k) CCD (GIV-X and GV-SP) (initial, recurrent, upgrade, differences and transition training).
l) Abnormal/Emergency Procedures (initial, recurrent, upgrade and transition training). GAC's philosophy is to not identify any steps in the GV, GV-SP, and GIV-X abnormal or emergency procedures as so-called "memory items." While there are no defined memory items in the AFM, pilots should still be familiar enough with the aircraft to be able to perform initial and critical items without first referencing associated documentation. In addition, pilots are expected to don oxygen masks promptly when appropriate (e.g., when smoke is detected). Operators and training providers should ensure pilots are trained accordingly during initial, transition, upgrade and recurrent training.
m) Nosewheel Steering (NWS) Failure on Landing (initial, recurrent, upgrade and transition training). The NWS may fail upon touchdown, caused by an uncommanded steering input that results in directional deviation and NWS system reversion to free-castering mode. Tiller steering and rudder pedal controlled NWS will be inoperative. This will require the use of rudder and differential braking to maintain directional control on the runway. The NWS failure is indicated by the amber "STEER BY WIRE FAIL" engine indicating and crew alerting system (EICAS) message. The accompanying aural indication will be inhibited.

9.2.1.1 Abnormal and emergency procedures are presented in quick reference handbooks (QRH) of an identical format for all three aircraft. Although some individual steps may differ or use different acronyms, these steps are carried out under the guidance of the handbook in a logical decision making manner.

9.2.1.2 GAC has advised that the initial, critical pilot responses for the following emergency procedures should be performed promptly without reference to a checklist:

- Rejected takeoff (RTO).
- Engine failure/fire after takeoff decision speed (V1).
- Emergency descent.

- Rapid decompression.
- AP or autothrottle (AT) uncommanded disconnect.
- Engine exceedance.
- Overspeed.
- Stall protection/stall warning activation.
- Flight control jams.
- Total loss of braking.
- EGPWS alert.
- Windshear alert.
- TCAS alert.

9.2.2 Pilots must receive special emphasis on, and perform the following areas during flight training:

a) Dual hydraulic system malfunctions (initial, recurrent, upgrade and transition training).
b) Aileron/elevator disconnect (jammed controls in each axis) (initial, recurrent, upgrade and transition training).
c) Instrument landing system (ILS) approach on standby instruments (initial, recurrent, upgrade and transition training).
d) PFD, navigation display (ND), engine indicating and crew alerting system (EICAS) reversionary modes (initial, recurrent, upgrade and transition training).
e) Integrated use of EICAS messages, switch positions, and synoptic pages to determine aircraft system status (initial, recurrent, upgrade and transition training).
f) Using autopilot (AP) for completion of the emergency descent maneuver (EDM) (initial, recurrent, upgrade and transition training).
g) Slow engine response. Engine response to full power requests is slow at high altitudes and during any maneuvers with flaps less than 22°. The FSB strongly recommends that a thorough preflight briefing, highlighting engine spool-up time is accomplished prior to conducting aircraft flight training in the following areas: impending stalls, touch-and-go landings, and simulated one engine-inoperative (OEI) maneuvers. Aircraft touch-and-go landings at flaps zero is not recommended (initial, recurrent, upgrade and transition training).
h) HUD (see Appendix 4).
i) EFVS (see Appendix 5).
j) PlaneView System (GIV-X and GV-SP) (initial, recurrent, upgrade, differences and transition training).
k) Lateral control switch function (GIV-X) (initial, recurrent, upgrade, differences and transition training).
l) NWS Failure on Landing (initial, recurrent, upgrade and transition training). Flight training in a full flight simulator (FFS) should include: 1) prior completion of the AFM Before Landing checklist to inhibit the associated aural warning; and 2) the fault being induced upon nosewheel touchdown with a minimum of 15-knot (kt) crosswind up to the maximum demonstrated

crosswind. The FFS should be capable of triggering the malfunction automatically upon nosewheel touchdown.

9.3 Specific Flight Characteristics. Maneuvers or procedures required to be checked as referenced in the ATP and Type Rating for Airplane ACS. There are no specific flight characteristics.

9.4 Seat-Dependent Tasks. Pilots must receive training in these seat-dependent tasks:

a) HUD/HGS (left and/or right seat) when installed; initial, differences, upgrade, transition, and recurrent training. See Appendix 4.
b) Passenger oxygen system activation (right seat); initial training.
c) Manual landing gear extension (right seat); initial and recurrent training.
d) Nosewheel steering (left seat); initial, transition, upgrade, and recurrent training.
e) EFVS (left and/or right seat) when installed; see Appendix 5.

9.5 Regulatory Training Requirements Which Are Not Applicable to the GIV-X, GV, and GV-SP. None.

9.6 FSTDs. HUD/HGS must be trained in a Level C or higher FFS in both day and night conditions.

9.7 Training Equipment. There are no specific systems or procedures that are unique to the GIV-X, GV, or GV-SP aircraft that require specific training equipment.

9.8 Differences Training Between Related Aircraft. Pilots must receive differences training between the GIV-X, GV, and GV-SP. The level of training is specified in Appendix 3, Differences Tables.

10. PILOT CHECKING

10.1 Landing From a No-Flap or Nonstandard Flap Approach. The probability of flap extension failure on the GIV-X, GV, or GV-SP is not extremely remote due to system design. Therefore, demonstration of a no-flap approach and landing during pilot certification is required. During a §§ 61.58 proficiency check, 91.1065 competency check, or 135.293 competency check, this task may be required. Refer to Order 8900.1, Volume 5, Airman Certification, when the test or check is conducted in an aircraft versus a FFS.

10.2 Specific Flight Characteristics. Maneuvers or procedures required to be checked as referenced in the ATP and Type Rating for Airplane ACS. There are no specific flight characteristics.

10.3 Seat-Dependent Tasks. Pilots must be checked in these seat-dependent tasks:

a) HUD/HGS (left seat); initial and recurrent checking.
b) Nosewheel steering (left seat), initial, transition, upgrade, and recurrent checking.

10.4 Other Checking Items.

10.4.1 Proficiency in manual and automatic (including FMS) flight in normal, abnormal, and emergency situations must be demonstrated at each proficiency/competency check by all crewmembers.

10.4.2 The use of manual modes to operate systems, such as electrical, hydraulic, pressurization, environmental, etc., and emergency equipment must be demonstrated at each proficiency/competency check by all crewmembers.

10.4.3 The FSB strongly recommends that a thorough preflight briefing, highlighting engine spool-up time is accomplished prior to conducting checking in the aircraft in the following areas: impending stalls, touch-and-go landings, and simulated OEI maneuvers. Aircraft touch-and-go landings at flaps zero is not recommended.

10.5 FSTD. HUD/HGS must be checked in minimum of a Level C FFS in both day and night conditions.

10.6 Equipment. There are no specific systems or procedures that are unique to the GIV-X, GV, and GV-SP that require specific equipment.

10.7 Differences Checking Between Related Aircraft. Pilots must receive difference checking between the GIV-X, GV, and GV-SP and GIV-X, GV, and GV-SP. The level of checking is specified in Appendix 3.

11. PILOT CURRENCY

There are no additional currency requirements for the GIV-X, GV, or GV-SP other than those already specified in parts 61 and 135.

11.1 Differences Currency Between Related Aircraft. Not applicable.

12. OPERATIONAL SUITABILITY

The GIV-X, GV, and GV-SP is operationally suitable for operations under parts 91 and 135. The FSB determined operational compliance by conducting an evaluation of a GV (Aircraft Serial No. 505) on February 6, 1997. The FSB determined operational compliance by conducting an evaluation of a GV-SP (Aircraft Serial No. 5001) on February 18, 2003. The FSB determined operational compliance by conducting an evaluation of a GIV-X (Aircraft Serial No. 4003) on May 3-4, 2004. The list of operating rules evaluated is on file at the Transport Aircraft Long Beach AEG.

13. MISCELLANEOUS

13.1 Flightcrew Sleeping Facilities (Parts 91K and 135). The GAC GIV-X, GV, and GV-SP aft cabin crew sleeping facility as installed by STC Nos. ST03685AT-D and ST04308AT-D has been evaluated and determined to meet requirements of parts 91K and 135, AC 117-1, Flightcrew Member Rest Facilities, AC 121-31, Flightcrew Sleeping Quarters and Rest Facilities, and Order 8900.1.

13.2 Forward Observer Seat. The GIV-X, GV and GV-SP forward observer seat as installed by GAC product specification, Revision C, dated December 19, 1996, has been evaluated and determined to meet requirements of §§ 135.75(b) and AC 120-83, Flight Deck Observer Seat and Associated Equipment.

13.3 Aircraft Approach Category. The GIV-X is considered a Category D aircraft while the GV and GV-SP are considered to be Category C aircraft for the purposes of determining the appropriate instrument approach procedure category in accordance with § 97.3.

13.4 Emergency Evacuation.

13.4.1 Emergency Evacuation Crewmember (EEC) Training. During the GV-SP certification process, GAC asked the FAA to make an equivalent safety finding on the overwing exits because they did not meet current FAA certification standards. GAC requested, and the FAA accepted, that any time more than nine passengers are carried, an additional crewmember trained in emergency evacuation for the Gulfstream elliptical exits be required onboard. The FAA found that this provides an equivalent level of safety to overwing emergency exits that would meet current FAA certification standards. Therefore, the GV-SP will require an EEC on the aircraft any time more than nine passengers are carried. The specific training that an EEC is required to undergo is specified in Gulfstream Operating Manual Supplement (OMS) No. G550-OMS-1 for the GV-SP (G550) and OMS No. G500-OMS-1 for the GV-SP (G500-5000).

13.4.2 The GIV-X Does Not Require an EEC. The FAA certified the GIV-X overwing exits at an earlier certification rule amendment level based on the G-IV certification. The GV does not require an EEC.

13.5 Normal Landing Flaps. The GIV-X, GV and GV-SP normal “final flap setting” per § 91.126(c) is Flap 39.

APPENDIX 1. DIFFERENCES LEGEND

Training Differences Legend

Differences Level	Type	Training Method Examples	Conditions
A	Self-Instruction	• Operating manual revision (handout (HO)) • Flightcrew operating bulletin (HO)	• Crew has already demonstrated understanding on base aircraft (e.g., updated version of engine). • Minor or no procedural changes required. • No safety impact if information is not reviewed or is forgotten (e.g., different engine vibration damping mount). • Once called to attention of crew, the difference is self-evident.
B	Aided Instruction	• Audiovisual presentation (AV) • Tutorial computer-based instruction (TCBI) • Stand-up instruction (SU)	• Systems are functionally similar. • Crew understanding required. • Issues need emphasis. • Standard methods of presentation required.
C	Systems Devices	• Interactive (full-task) computer-based instruction (ICBI) • Cockpit Procedures Trainers (CPT) • Part task trainers (PTT) • Level 4 or 5 flight training device (FTD 4-5)	• Training can only be accomplished through systems training devices. • Training objectives focus on mastering individual systems, procedures, or tasks versus highly integrated flight operations or “real-time” operations. • Training devices are required to assure attainment or retention of crew skills to accomplish more complex tasks usually related to aircraft systems.
D	Maneuvers Devices	• Level 6 or 7 flight training device (FTD 6-7) • Level A or B full flight simulator (FFS A-B)	• Training can only be accomplished in flight maneuver devices in a real-time environment. • Training requires mastery of interrelated skills versus individual skills. • Motion, visual, control-loading, and specific environmental conditions may be required.
E	Level C/D FFS or Aircraft	• Level C or D full flight simulator (FFS C-D) • Aircraft (ACFT)	• Motion, visual, control-loading, audio, and specific environmental conditions are required. • Significant full-task differences that require a high fidelity environment. • Usually correlates with significant differences in handling qualities.

Checking Differences Legend

Differences Level	Checking Method Examples	Conditions
A	None	None
B	• Oral or written exam • Tutorial computer-based instruction (TCBI) self-test	Individual systems or related groups of systems.
C	• Interactive (full-task) computer-based instruction (ICBI) • Cockpit Procedures Trainers (CPT) • Part task trainers (PTT) • Level 4 or 5 flight training device (FTD 4-5)	• Checking can only be accomplished using systems devices. • Checking objectives focus on mastering individual systems, procedures, or tasks.
D	• Level 6 or 7 flight training device (FTD 6-7) • Level A or B full flight simulator (FFS A-B)	• Checking can only be accomplished in flight maneuver devices in a real-time environment. • Checking requires mastery of interrelated skills versus individual skills. • Motion, visual, control-loading, and specific environmental conditions may be required.
E	• Level C or D full flight simulator (FFS C-D) • Aircraft (ACFT)	Significant full-task differences that require a high fidelity environment.

APPENDIX 2. MASTER DIFFERENCES REQUIREMENTS (MDR) TABLE

These are the minimum levels of training and checking required, derived from the highest level in the Differences Tables in Appendix 3. Differences levels are arranged as training/checking.

To Related Aircraft ↓	From Base Aircraft →	GV-SP	G-V	GIV-X
GIV-X		B/B	C/B	Not applicable
G-V		C/B	Not applicable	C/B
GV-SP		Not applicable	C/B	C/B

APPENDIX 3. DIFFERENCES TABLES

This Design Differences Table, from the GIV-X to the GV-SP, was proposed by GAC and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: GIV-X TO RELATED AIRCRAFT: GV-SP	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Limitations	Maximum takeoff weight (MTOW) increased to 91,000 lb from 73,900 lb. MLW increased to 75,300 lb from 66,000 lb. Fuel quantity 41,300 lb vs. 29,500 lb. APU and Engine limitations differences.	No	No	A	A
	ATA 20 Aircraft General	Performance MTOW 91,000 lb. Increase of 17,100 lb.	No	No	A	A
	ATA 23 Communications	Selective Call (SELCAL) Test and CVR Test switches relocated.	No	Yes	A	A
	ATA 23 Communications	SELCAL and CVR test switches different test methodology.	No	Yes	A	A
	ATA 27 Flight Controls	Split flight controls added.	Yes	Yes	C	A
	ATA 27 Flight Controls	Trailing edge contours added to inboard trailing edge of flaps.	No	No	A	A

FROM BASE AIRCRAFT: GIV-X TO RELATED AIRCRAFT: GV-SP	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 27 Flight Controls	No Alternate Flap Switch.	No	Yes	A	A
	ATA 27 Flight Controls	Standby rudder and nosewheel steering on auxiliary (AUX) pump capability.	No	Yes	B	A
	ATA 27 Flight Controls	Spoiler Control switch added. Lateral Control Switch deleted.	Yes	Yes	B	B
	ATA 27 Flight Controls	Vortex generators added to lower horizontal stabilizer surfaces and upper elevator surfaces.	No	Yes	A	A
	ATA 28 Fuel	Heated Fuel Return System.	No	Yes	B	A
	ATA 29 Hydraulic Power	AUX Hydraulic Boost Pump added.	No	No	A	A
	ATA 30 Ice and Rain Protection	Pitot Probe Heat System changed.	No	Yes	A	A
	ATA 32 Landing Gear	Four brake wear indicator pins vs. two and weight on wheels (WOW) switches.	No	Yes	A	A
	ATA 49 Airborne Auxiliary Power	Different APU installed, RE220 vs. 36-150, both supplied by Honeywell.	No	Yes	B	A

FROM BASE AIRCRAFT: GIV-X TO RELATED AIRCRAFT: GV-SP	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 49 Airborne Auxiliary Power	Bleeds off takeoff capability added.	No	Yes	B	A
	ATA 49 Airborne Auxiliary Power	Starter-assisted airstart capability for main engines.	No	Yes	B	A
	ATA 49 Airborne Auxiliary Power	Bleeds off takeoff capability added.	No	No	B	A
	ATA 71 Powerplant	Thrust increased by 1,535 lb to 15,385 lb.	No	No	A	A
	ATA 71 Powerplant	BR710 installed vs. Tay 611-8C.	No	Yes	B	A
	ATA 78 Engine Exhaust	Thrust Reverser Manual Stow switches (two) installed.	No	Yes	B	A

This Maneuver Differences Table, from the GIV-X to the GV-SP, was proposed by GAC and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: GIV-X **TO RELATED AIRCRAFT: GV-SP**	**MANEUVER**	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**TRAINING**	**CHECKING**
	Normal Takeoff	Bleeds Off.	No	Yes	A	A

This Design Differences Table, from the GV-SP to the GIV-X, was proposed by GAC and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: GV-SP TO RELATED AIRCRAFT: GIV-X	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Limitations	MTOW decreased by 17,100 lb to 73,900 lb. MLW decreased to 66,000 lb. Fuel quantity 29,500 lb vs. 41,300 lb. APU and engine limitations differences.	No	No	A	A
	ATA 20 Aircraft General	Performance MTOW 17,100 lb decrease to 73,900 lb.	No	No	A	A
	ATA 23 Communications	SELCAL Test and CVR Test switches relocated.	No	Yes	A	A
	ATA 23 Communications	SELCAL and CVR test switches different test methodology.	No	Yes	A	A
	ATA 27 Flight Controls	Lateral Control switch added. Spoiler Control Switch deleted.	Yes	Yes	B	B
	ATA 27 Flight Controls	Alternate Flap Control switch added.	No	Yes	B	A
	ATA 27 Flight Controls	No split flight controls.	Yes	Yes	B	A
	ATA 27 Flight Controls	Trailing edge contours not installed.	No	No	A	A

FROM BASE AIRCRAFT: GV-SP TO RELATED AIRCRAFT: GIV-X	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 27 Flight Controls	No standby rudder and no nosewheel steering on AUX pump capability.	Yes	Yes	B	A
	ATA 27 Flight Controls	Vortex generators deleted from lower horizontal stabilizer surfaces and upper elevator surfaces.	No	Yes	A	A
	ATA 28 Fuel	No Heated Fuel Return System installed.	No	Yes	A	A
	ATA 29 Hydraulic Power	AUX Hydraulic Boost Pump deleted.	No	No	A	A
	ATA 30 Ice and Rain Protection	Pitot Probe Heat System changed.	No	Yes	A	A
	ATA 32 Landing Gear	Two brake wear indicator pins vs. Four.	No	Yes	A	A
	ATA 49 Airborne Auxiliary Power	Different APU installed, RE220 vs. 36-150, both supplied by Honeywell.	No	Yes	B	A
	ATA 49 Airborne Auxiliary Power	No Bleeds Off takeoff capability.	No	Yes	A	A
	ATA 71 Powerplant	Thrust decreased 1,535 lb to 13,850 lb.	No	No	A	A
	ATA 71 Powerplant	Tay 611-8C installed vs. BR710.	No	Yes	B	A

FROM BASE AIRCRAFT: GV-SP TO RELATED AIRCRAFT: GIV-X	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 78 Engine Exhaust	No Manual Thrust Reverser Stow switches installed.	No	Yes	A	A

This Design Differences Table, from the GIV-X to the GV, was proposed GAC and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: GIV-X TO RELATED AIRCRAFT: GV	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Limitations	MTOW increased to 90,500 lb from 73,900 lb.	No	No	A	A
	ATA 20 Aircraft General	Performance MTOW 90,500 lb. Increase of 16,600 lb.	No	No	A	A
	ATA 20 Aircraft General	Observer seat and location changed.	No	No	B	A
	ATA 21 Air Conditioning	Environmental Control System Outflow valve changed to butterfly valve.	No	Yes	A	A
	ATA 22 Autoflight	TOGA Flight Director Command Bars initiate at 12° vs. 8° on GIV-X.	No	No	A	A
	ATA 23 Communications	New Audio System.	No	No	C	A
	ATA 23 Communications	Radio Tuning Through Radio Frequency Management Unit (RFMU).	No	Yes	C	A
	ATA 24 Electrical Power	Revised Location of Power Distribution Box (PDB) circuit breaker panels.	No	Yes	A	A
	ATA 27 Flight Controls	Split flight controls added.	Yes	Yes	C	A
	ATA 27 Flight Controls	No Alternate Flap Switch.	No	Yes	A	A

FROM BASE AIRCRAFT: GIV-X TO RELATED AIRCRAFT: GV	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 27 Flight Controls	Standby Rudder installed with nosewheel steering on the AUX pump capability (including AUX PUMP ground spoiler pressure).	Yes	Yes	B	A
	ATA 27 Flight Controls	Spoiler Control Switch added. Lateral Control Switch deleted.	Yes	Yes	B	B
	ATA 27 Flight Controls	Vortex generators added to lower horizontal stabilizer surfaces and upper elevator surfaces.	No	Yes	A	A
	ATA 28 Fuel	Heated Fuel Return System added.	No	Yes	B	A
	ATA 29 Hydraulic Power	AUX Hydraulic Boost Pump added.	No	No	A	A
	ATA 30 Ice and Rain Protection	Pitot Probe Heat System changed.	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	Standby Engine Instrument on RFMU.	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	Data Acquisition Unit (DAU) and Fault Warning Computer (FWC) replaces Modular Avionics Unit (MAU).	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	DC.	No	Yes	C	A

FROM BASE AIRCRAFT: GIV-X TO RELATED AIRCRAFT: GV	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	Electronic Checklist Auto Pop-up Feature enabled.	No	Yes	B	A
	ATA 32 Landing Gear	Four brake wear indicator pins vs. two and WOW switches.	No	Yes	A	A
	ATA 34 Navigation	Inertial Reference System (IRS) ON/OFF switches removed and replaced with Mode Select Unit switches.	No	Yes	B	A
	ATA 34 Navigation	EICAS FMS Joystick Panel.	No	None	B	A
	ATA 34 Navigation	Six DUs vs. four DUs.	No	Yes	C	B
	ATA 34 Navigation	No CCDs Used in Conjunction with Displays.	No	Yes	C	B
	ATA 34 Navigation	Horizontal situation indicator (HSI) on RFMU.	No	Yes	B	A
	ATA 34 Navigation	LaserTrack.	No	Yes	C	B
	ATA 34 Navigation	Standby Flight instruments have different design and location.	No	Yes	A	A
	ATA 49 Airborne Auxiliary Power	Different APU installed with capability for APU-assisted main engine airstart and different electrical load capabilities.	No	Yes	B	A
	ATA 52 Doors	Main Door moved aft 24 in.	No	No	A	A

FROM BASE AIRCRAFT: GIV-X TO RELATED AIRCRAFT: GV	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 52 Doors	Aft Lavatory Dump Door relocated.	No	No	A	A
	ATA 71 Powerplant	Thrust increased by 900 lb to 14,750 lb.	No	No	A	A
	ATA 71 Powerplant	BR710 vs. Tay 611-8C Installed.	No	Yes	B	A
	ATA 78 Engine Exhaust	Two Thrust Reverser Manual Stow Switches installed.	No	Yes	B	A

This Design Differences Table, from the GV to the GIV-X, was proposed GAC and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: GV TO RELATED AIRCRAFT: GIV-X	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Limitations	MTOW decreased to 73,900 lb from 90,500 lb. Fuel Quantity 29,500 lb vs. 41,300 lb. APU and engine limitations differences.	No	Yes	A	A
	ATA 20 Aircraft General	Performance MTOW 73,900 lb. Decrease of 16,600 lb.	No	No	A	A
	ATA 20 Aircraft General	Observer seat and location changed.	No	No	B	A
	ATA 21 Air Conditioning	Environmental Control System Outflow valve changed to thrust recovery outflow valve.	No	Yes	A	A
	ATA 22 Autoflight	TOGA Flight Director Command Bars initiate at 8° vs. 12° on GV.	No	No	A	A
	ATA 23 Communications	New Audio System.	No	Yes	C	A
	ATA 23 Communications	Radio Tuning Through MCDU and graphically.	No	Yes	B	A
	ATA 23 Communications	SELCAL test and CVR test switches relocated.	No	Yes	A	A

FROM BASE AIRCRAFT: GV TO RELATED AIRCRAFT: GIV-X	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 24 Electrical Power	Revised Location of PDB circuit breaker panels.	No	Yes	A	A
	ATA 27 Flight Controls	Lateral Control switch added. Spoiler Control Switch deleted.	Yes	Yes	B	B
	ATA 27 Flight Controls	No Standby Rudder installed or nosewheel steering on the AUX pump capability.	Yes	Yes	B	A
	ATA 27 Flight Controls	No split flight controls.	Yes	Yes	A	A
	ATA 27 Flight Controls	Vortex generators deleted from lower horizontal stabilizer surfaces and upper elevator surfaces.	No	Yes	A	A
	ATA 27 Flight Controls	Alternate Flap Switch added.	No	Yes	B	A
	ATA 28 Fuel	No Heated Fuel Return System.	No	Yes	A	A
	ATA 29 Hydraulic Power	No AUX Hydraulic Boost Pump.	No	No	A	A
	ATA 30 Ice and Rain Protection	Pitot Probe Heat System changed.	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	Electronic Checklist Auto Pop-up Feature deleted.	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	Standby Engine Instruments on MCDU.	No	Yes	A	A

FROM BASE AIRCRAFT: GV TO RELATED AIRCRAFT: GIV-X	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	DAU and FWC replaced by MAU.	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	DC.	No	Yes	C	A
	ATA 34 Navigation	IRS Mode Select Unit switches removed and replaced with ON/OFF switches.	No	Yes	A	A
	ATA 34 Navigation	Four DUs vs. six DUs.	No	Yes	C	B
	ATA 34 Navigation	Added Dual CCDs used in Conjunction with Displays.	No	Yes	C	B
	ATA 34 Navigation	LaserTrack removed.	No	Yes	A	A
	ATA 34 Navigation	Standby Flight instruments have different design and location.	No	Yes	B	A
	ATA 34 Navigation	MCDU on Emergency Power.	No	Yes	B	B
	ATA 49 Airborne Auxiliary Power	Different APU installed with no capability for APU-assisted main engine airstart and different electrical load capabilities.	No	Yes	B	A
	ATA 52 Doors	Main Door moved forward 24 in.	No	No	A	A

FROM BASE AIRCRAFT: GV TO RELATED AIRCRAFT: GIV-X	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 52 Doors	Aft Lavatory Dump Door relocated.	No	No	A	A
	ATA 71 Powerplant	Thrust decreased by 900 lb to 13,850 lb.	No	No	A	A

This Design Differences Table, from the GV to the GV-SP, was proposed GAC and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: GV TO RELATED AIRCRAFT: GV-SP	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Limitations	MTOW increased to 91,000 lb from 90,500 lb.	No	No	A	A
	ATA 20 Aircraft General	Performance MTOW 91,000 lb. Increase of 500 lb.	No	No	A	A
	ATA 21 Air Conditioning	Environmental Control System Outflow valve changed to thrust recovery outflow valve.	No	No	A	A
	ATA 22 Autoflight	TOGA Flight Director Command Bars initiate at 8° vs. 12° on GV.	No	No	A	A
	ATA 23 Communications	New Audio System.	No	Yes	C	A
	ATA 23 Communications	Radio Tuning Through MCDU and graphically.	No	No	B	A
	ATA 24 Electrical Power	Revised Location of PDB circuit breaker panels.	No	Yes	A	A
	ATA 25 Equipment/Furnishings	Redesign and relocation of cockpit observer's seat to behind Co-Pilot's seat.	No	No	B	A
	ATA 27 Flight Controls	Trailing edge contours added to inboard trailing edge of flaps.	No	No	A	A

FROM BASE AIRCRAFT: GV TO RELATED AIRCRAFT: GV-SP	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	Electronic Checklist Auto Pop-up Feature deleted.	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	DAU and FWC replaced by MAU.	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	Standby Engine Parameters available on No. 1 MCDU only.	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	Different formatting on some synoptic displays.	No	Yes	B	A
	ATA 34 Navigation	IRS Mode Select Unit switches removed and replaced with ON/OFF switches.	No	Yes	A	A
	ATA 34 Navigation	Four DUs vs. Six DUs with different formatting.	No	Yes	C	B
	ATA 34 Navigation	Added Dual CCDs Used in Conjunction with Displays.	No	Yes	C	B
	ATA 34 Navigation	DCs have different menus.	No	Yes	C	A
	ATA 34 Navigation	Standby Flight instruments have different design and location.	No	Yes	B	B
	ATA 34 Navigation	DU Controller has four overhead switches instead of three.	No	Yes	B	B

FROM BASE AIRCRAFT: GV TO RELATED AIRCRAFT: GV-SP	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 34 Navigation	RNP and Estimated Position Uncertainty (EPU) is displayed on PFD.	No	Yes	B	A
	ATA 34 Navigation	MCDU on Emergency Power.	No	Yes	B	B
	ATA 38 Water/Waste	Fuselage conformal fresh water tank.	No	Yes	A	A
	ATA 38 Water/Waste	Relocation of vacuum lavatory waste tank from baggage compartment to above APU.	No	No	A	A
	ATA 49 Airborne Auxiliary Power	Bleeds off takeoff capability added.	No	Yes	B	A
	ATA 52 Doors	Main Door moved forward 24 in.	No	No	A	A
	ATA 52 Doors	Aft Lavatory Dump Door relocated.	No	No	A	A
	ATA 53 Fuselage	27 Boundary Layer Energizers added above the canopy.	No	No	A	A
	ATA 56 Windows	Addition of 7th cabin window.	No	No	A	A
	ATA 57 Wings	Seven Vortex Generators relocated outboard on each wing.	No	No	A	A
	ATA 71 Powerplant	Thrust increased by 635 lb to 15,385 lb.	No	No	A	A

This Maneuver Differences Table, from the GV to the GV-SP, was proposed by GAC and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: GV TO RELATED AIRCRAFT: GV-SP	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Normal Takeoff	Bleeds Off.	No	Yes	A	A

This Design Differences Table, from the GV-SP to the GV, was proposed GAC and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: GV-SP TO RELATED AIRCRAFT: GV	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Limitations	MTOW decreased by 500 lb to 90,500 lb.	No	No	A	A
	ATA 20 Aircraft General	Performance MTOW 500 lb decrease to 90,500 lb.	No	No	A	A
	ATA 21 Air Conditioning	Environmental Control System Outflow valve changed to butterfly style.	No	No	A	A
	ATA 22 Autoflight	TOGA Flight Director Command Bars initiate at 12° vs. 8° on GV-SP.	No	No	A	A
	ATA 23 Communications	New audio system.	No	Yes	C	A
	ATA 23 Communications	Radio tuning accomplished through RFMUs.	No	Yes	C	A
	ATA 24 Electrical Power	Revised location of PDBs and associated circuit breakers.	No	Yes	A	A
	ATA 25 Equipment/Furnishings	Redesign and relocation of cockpit observer's seat to behind Captain's seat.	No	No	B	A
	ATA 27 Flight Controls	Trailing edge contours not installed.	No	No	A	A

FROM BASE AIRCRAFT: GV-SP TO RELATED AIRCRAFT: GV	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	Electronic Checklist has Auto pop-up Feature vs. passive checklist on GV-SP.	No	Yes	B	A
	ATA 31 Indicating/Recording Systems	MAU replaced by DAU and FWC.	No	Yes	C	B
	ATA 31 Indicating/Recording Systems	Engine Parameters available on either RFMU.	No	Yes	A	A
	ATA 31 Indicating/Recording Systems	Different formatting on some synoptic displays.	No	Yes	B	A
	ATA 34 Navigation	EICAS FMS Joystick Panel.	No	No	B	A
	ATA 34 Navigation	LaserTrack.	No	Yes	C	B
	ATA 34 Navigation	IRS ON/OFF switches replaced with IRS Mode Select Unit switches.	No	Yes	B	A
	ATA 34 Navigation	Six DUs vs. four DUs with different formatting.	No	Yes	C	B
	ATA 34 Navigation	No CCDs installed.	No	Yes	C	B
	ATA 34 Navigation	DCs have different menus.	No	Yes	C	B

FROM BASE AIRCRAFT: GV-SP TO RELATED AIRCRAFT: GV	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 34 Navigation	Standby Flight instruments have different design and location.	No	Yes	A	A
	ATA 34 Navigation	DU Controller has three overhead switches instead of four.	No	Yes	C	B
	ATA 34 Navigation	RNP and EPU are not displayed on PFD.	No	Yes	B	B
	ATA 38 Water/Waste	Non-fuselage conformal fresh water tank.	No	No	A	A
	ATA 38 Water/Waste	Relocation of vacuum lavatory waste tank from above APU to baggage compartment.	No	No	A	A
	ATA 49 Airborne Auxiliary Power	No Bleeds Off takeoff capability.	No	Yes	A	A
	ATA 52 Doors	Main Door moved aft 24 in.	No	No	A	A
	ATA 52 Doors	Aft Lavatory Dump Door relocated.	No	No	A	A
	ATA 53 Fuselage	27 Boundary Layer Energizers removed from the canopy.	No	No	A	A
	ATA 56 Windows	Removal of 7th cabin window.	No	No	A	A
	ATA 57 Wings	Seven Vortex generators relocated inboard on each wing.	No	No	A	A
	ATA 71 Powerplant	Thrust reduced 635 lb to 14,750 lb.	No	No	A	A

APPENDIX 4. HEAD-UP DISPLAY (HUD) SYSTEMS

1. BACKGROUND

In September 1997, the GV FSB participated in an in-flight evaluation of the Honeywell HUD Model 2020 during its development using GAC's GV aircraft. In November 1997, the FSB conducted certification flight tests along with the responsible Aircraft Certification Service office in GAC's GV aircraft in Savannah, GA. Flight testing consisted of approximately 30 HUD approaches at three different airports, using CAT I and II procedures during day, night, VMC, and IMC. The FSB also evaluated GAC's proposed GV AFMS for HUD operations and GAC's proposed HUD CAT II appendix to the GV AFMS for CAT II operations.

In June 2009, the FSB conducted flight evaluations of HUD II. "HUD II," utilizes an LCD which is different from the raster image on Honeywell HUD Model 2020 HUD. HUD II also has a larger combiner than HUD. Some of the HUD II symbology differs from HUD, such as the caged Flight Path Vector (FPV), the non-conformal lateral deviation indicator (LDI), and the unusual attitudes.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- GV.
- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots receiving initial HUD training should have multiengine transport turbojet aircraft, new generation avionics, high-altitude operations, FMS, or military experience. Pilots without this experience may require additional training.

4.2 Special Emphasis.

- Symbology.
- FPV.
- Non-conformal LDI.
- Unusual attitudes.

4.3 Ground Training. The FSB has determined that each pilot in command (PIC) of an aircraft equipped with a HUD system should receive a minimum of 3 hours of ground training.

4.3.1 The 3 hours of ground training is intended for pilots receiving standalone training on the HUD system. A pilot who is progressing successfully through an initial training program that has HUD training (including all three elements listed below) integrated into the curriculum and is determined to be adequately trained and certified proficient by the instructor do not need to complete the three standalone hours of ground training. Refer to § 135.329(e).

4.3.1.1 Ground Training:

a) Crew coordination.
b) Crew briefings and callouts.
c) Duties of pilot flying (PF) and pilot monitoring (PM).

4.4 Flight Training. The FSB has determined that each PIC of an aircraft equipped with a HUD system should receive a minimum of 4 hours of FFS training in the left seat of a Level C with a daylight visual display or Level D FFS.

4.4.1 A HUD-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-equipped aircraft.

4.4.2 Four hours of FFS or aircraft in-flight training is intended for pilots receiving standalone training on the HUD system. A pilot who is progressing successfully through an initial training program that has HUD training (including all 10 elements listed below) integrated into the curriculum and is determined to be adequately trained and certified proficient by the instructor do not need to complete the 4 standalone hours of FFS/aircraft in-flight training.

a) Use of caged, uncaged, and clear modes (especially in crosswind conditions).
b) Use of the pitch limit indicator (PLI) during windshear escape.
c) Approaches to “black hole” airports using the Flight Path Angle (FPA).
d) Use of the acceleration cue as a potential FPA.
e) Relationship of the glidepath angle to the symbolic runway.
f) Use of the flare symbol as a cue in the Honeywell HUD Model 2020 and as guidance in the HUD II.
g) Approaches into the top of an undercast during daylight and night conditions.
h) Recovery from unusual attitudes.
i) TCAS resolution advisory.
j) Takeoff using the FPA to meet a required climb gradient.

4.5 Differences. Some of the HUD II symbology differs from HUD, such as the caged FPV, the non-conformal LDI, and the unusual attitudes.

4.5.1 Pilots transitioning from HUD to HUD II or from HUD II to HUD should be trained on the differences using a Level A HO.

4.5.2 HUD II checking requirements are the same as those described below for HUD.

5. PILOT CHECKING

Checking requires a proficiency check conducted in a Level C FFS with a daylight visual display, in a Level D FFS, or on a HUD-equipped aircraft.

- At least one takeoff and departure procedure utilizing the HUD.
- Minimum of one instrument approach and landing utilizing the HUD.
- Minimum of one takeoff or missed approach without utilizing the HUD.
- Minimum of one instrument approach without utilizing the HUD.
- Takeoff using the FPA to meet a required climb gradient.

6. PILOT CURRENCY

6.1 Differences Between Related Aircraft. The GV-SP and GIV-X HUDs have been found to be functionally equivalent to the GV HUD. All requirements listed above apply to the GV, GV-SP, and GIV-X HUDs.

7. OPERATIONAL SUITABILITY

The FSB found the Honeywell HUD Model 2020 operationally suitable for all phases of flight and for U.S. CAT I and II operations.

The FSB found HUD II, as well as the associated AFM change, to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 5. ENHANCED FLIGHT VISION SYSTEM (EFVS) OPERATIONS

Refer to 14 CFR part 61, § 61.66 and the current edition of AC 90-106, Enhanced Flight Vision Systems, for training, recent flight experience, and proficiency requirements for EFVS operations. Refer to the current edition of AC 90-106 and 14 CFR part 91, § 91.1065(g) or part 135 § 135.293(i) as applicable for EFVS task requirements during part 91 subpart K (part 91K) or part 135 competency checks. The FSB has determined that EFVS is operationally suitable for use during EFVS operations under § 91.176(a) or (b).

An operational suitability determination does not constitute an operational authorization.

APPENDIX 6. PLANEVIEW AVIONICS SOFTWARE VERSION "C"

1. BACKGROUND

In August 2005, the FSB conducted flight evaluations of PlaneView Avionics Software Version "C" in a GIV-X. This software added features such as charts, graphical flight planning, uplinked weather, video, enhanced envelope protection system, and vertical situation display with terrain.

The PlaneView Charts function is FAA-certified as part of the aircraft's type design. The PlaneView Charts function may fail if a Data Management Unit (DMU), local area network (LAN), or Personal Computer Memory Card International Association (PCMCIA) card fails, so either paper charts or an Electronic Flight Bag (EFB) that is accepted by the FAA and contains airport diagrams, departure, arrival, and approach charts must be readily available to the flightcrew.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- GV.
- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots receiving initial PlaneView Avionics Software Version C training should have multiengine transport turbojet aircraft, new generation avionics, high-altitude operations, FMS, or military experience. Pilots without this experience may require additional training.

4.2 Special Emphasis. None.

4.3 Ground Training. See paragraph 4.5, Differences, below.

4.4 Flight Training. See paragraph 4.5, Differences, below.

4.5 Differences. Pilots transitioning from PlaneView Avionics Software Version "B" to "C" in the GIV-X, GV, or GV-SP should be trained on the differences by utilizing a Level C differences training device or higher.

5. PILOT CHECKING

None.

6. OPERATIONAL SUITABILITY

The FSB found PlaneView Avionics Software Version "C," as well as the associated AFM change, to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 7. PLANEVIEW AVIONICS SOFTWARE VERSION "D"

1. BACKGROUND

In February 2007, the FSB conducted a flight evaluation of PlaneView Avionics Software Version "D" in a GV-SP. This software added FMS features such as VGP, RNP SAAAR, performance step climb, takeoff obstacle clearance calculations, and graphical radio tuning. It also added RAAS.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- GV.
- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots receiving initial PlaneView Avionics Software Version D training should have multiengine transport turbojet aircraft, new generation avionics, high-altitude operations, FMS, or military experience. Pilots without this experience may require additional training.

4.2 Special Emphasis. Pilots training RNP SAAAR procedures should use the guidance found in the current edition of FAA AC 90-101, Approval Guidance for RNP Procedures with AR.

4.3 Ground Training. See paragraph 4.5, Differences, below.

4.4 Flight Training. See paragraph 4.5, Differences, below.

4.5 Differences. Pilots transitioning from PlaneView Avionics Software Version "B" to "D" or from Version "C" to "D" in the GIV-X, GV, or GV-SP should be trained on the differences by utilizing a Level C differences training device or higher.

5. PILOT CHECKING

None.

6. OPERATIONAL SUITABILITY

The FSB found PlaneView Avionics Software Version "D," as well as the associated AFM change, to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 8. PLANEVIEW AVIONICS SOFTWARE VERSION "E"

1. BACKGROUND

In April and November 2007, the FSB conducted flight evaluations of PlaneView Avionics Software Version "E" in a GIV-X. This software added SV PFD. SV PFD depicts terrain, obstacles, and airports with texture and colors on the PFD. It obtains the data from the Terrain Awareness and Warning System (TAWS) database.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- GV.
- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots receiving initial PlaneView Avionics Software Version E training should have multiengine transport turbojet aircraft, new generation avionics, high-altitude operations, FMS, or military experience. Pilots without this experience may require additional training.

4.2 Special Emphasis. None.

4.3 Ground Training. See paragraph 4.5, Differences, below.

4.4 Flight Training. See paragraph 4.5, Differences, below.

4.5 Differences. Pilots transitioning from PlaneView Avionics Software Version "C" to "E" or from Version "D" to "E" in the GIV-X, GV, or GV-SP should be trained on the differences by utilizing a Level C differences training device or higher.

5. PILOT CHECKING

None.

6. OPERATIONAL SUITABILITY

The FSB found PlaneView Avionics Software Version "E," as well as the associated AFM change, to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 9. PLANEVIEW AVIONICS SOFTWARE VERSION "F"

1. BACKGROUND

In June 2009, the FSB conducted flight evaluations of PlaneView Avionics Software Version "F" in a GIV-X. This software added map functionality and three other options for operators to purchase: 1) enhanced navigation; 2) enhanced SV PFD; and 3) XM Weather.

The PlaneView Avionics Software Version "F" "Basic Load" includes the following functions: improved map identifiers declutter logic, improved map airway labeling, improvement on map to graphically join airways, HUD II interface capability, pilot-controlled communication management function (CMF) selection switch, and improved (table-augmented) performance within the FMS. A customer option to enable automatic linking of abnormal and emergency checklists to a defined set of activated CAS messages is also included.

Additionally, there are customer option packages associated with Cert. "F" with the functions grouped into the following packages:

1.1 Enhanced Navigation.

a) FANS 1 Controller-Pilot Data Link Communications (CPDLC) using existing Aircraft.
b) Aircraft Communications Addressing and Reporting System (ACARS) protocol.
c) GPS SBAS reception.
d) LPV approach capability.
e) RNP 0.1 navigation capability.
f) Electronic terminal charts stored on each advanced graphics module (AGM).
g) Terrain elevation displayed on map at pilot-selected locations.
h) Automatic preview of short-range navigation approach.
i) Automatic transition from short-range navigation source to long-range navigation (LRN) source and automatic arming of FMS/lateral navigation (LNAV) flight director mode upon selection of TOGA feature.
j) Retention of FMS/LNAV flight director mode upon selection of TOGA feature when using LRN source.
k) Temperature-compensated waypoint altitude constraints and vertical navigation (VNAV) performance in terminal area.
l) Circling approach capability.

1.2 Enhanced SV PFD. The enhanced SV PFD includes the following improvements to the basic version: terrain conformal range rings, grid lines oriented north-south and east-west, terrain depicted on the HSI, a frustum depicted on the HSI representing the viewed area of the SV PFD, and the TAWS and TCAS automatic "pop-up" on the HSI.

1.3 XM Weather Radar (WX) Weather. The map can display the following three weather products, either individually or combined, which are automatically received at specific intervals: Next Generation Weather Radar (NEXRAD) Doppler radar, infrared (IR) composite images of clouds, and winds aloft.

NOTE: The PlaneView Charts function is FAA-certified as part of the aircraft's type design in Cert. "F." The AFM limitation applied during PlaneView Avionics Software Version "C," which requires "either paper charts or an EFB that is accepted by the FAA and contains airport diagrams, departure, arrival, and approach charts must be readily available to the flightcrew," does not apply to Cert. F-equipped aircraft.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- GV.
- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots receiving initial PlaneView Avionics Software Version F training should have multiengine transport turbojet aircraft, new generation avionics, high-altitude operations, FMS, or military experience. Pilots without this experience may require additional training.

4.2 Special Emphasis. None.

4.3 Ground Training. See paragraph 4.5, Differences, below.

4.4 Flight Training. See paragraph 4.5, Differences, below.

4.5 Differences. Pilots transitioning from PlaneView Avionics Software Version "D" to "F" or from version "E" to "F" in the GIV-X, GV, or GV-SP should be trained on the differences using the information provided in Table 1, Training Differences, below.

Table 1. Training Differences

From	To (1)	Training Level
Cert. "D" or "E"	Cert. "F" (Basic Load)	A
	Cert. "F" with Enhanced Navigation	C (2)
	Cert. "F" with Enhanced SV PFD	A
	Cert. "F" with XM Weather	A

NOTE 1: Any combination of customer option packages will be trained to the highest training level.

NOTE 2: The devices must be capable of emulating FMS and cockpit displays performance, allowing pilot entry of appropriate FMS selections and presenting "real-time" information on the displays during the conduct of the flight.

5. PILOT CHECKING

None.

6. OPERATIONAL SUITABILITY

The FSB found PlaneView Avionics Software Version “F,” as well as the associated AFM change, to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 10. PLANEVIEW AVIONICS SOFTWARE VERSION "G"

1. BACKGROUND

In April 2011, the FSB conducted flight evaluations of PlaneView Avionics Software Version "G" in a GIV-X. This software added the following features: early missed approach activation with the MCDU and TOGA, LPV approach capture from above, maximum descent angle improvements, data link recording on the CVR, path-based TCAS guidance on the SV PFD, listing of multiple localizer approaches to the same runway, and update to fuel tank temperature CAS message and related synoptics for the GIV-X only.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- GV.
- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots receiving initial PlaneView Avionics Software Version G training should have multiengine transport turbojet aircraft, new generation avionics, high altitude operations, FMS, or military experience. Pilots without this experience may require additional training.

4.2 Special Emphasis. None.

4.3 Ground Training. See paragraph 4.5, Differences, below.

4.4 Flight Training. See paragraph 4.5, Differences, below.

4.5 Differences. Pilots transitioning from PlaneView Avionics Software Version "D," "E," or "F" to "G" in the GIV-X, GV, or GV-SP should be trained using one of the following Level A differences training methods: PlaneView Pilot Familiarization Guide or PlaneView Pilot Operating Handbook for Cert. "G."

4.5.1 Pilots transitioning to PlaneView avionics software enhanced version "G" who have not received training on Cert. "F" enhanced navigation or enhanced SV PFD should be trained on the differences using the information provided in Table 2, Training Differences.

Table 2. Training Differences

From	To (1)	Training Level
Cert. "D," "E," or "F" Basic	Cert. "G" (Basic Load)	A
	Cert. "F" or "G" with Enhanced Navigation	C (2)
	Cert. "F" or "G" with XM Weather	A
	Cert. "F" or "G" with Enhanced SV PFD	A
Cert. "F" Enhanced	Cert. "G" Enhanced	A

NOTE 1: Any combination of customer option packages will be trained to the highest training level.

NOTE 2: The devices must be capable of emulating FMS and cockpit displays performance, allowing pilot entry of appropriate FMS selections and presenting "real-time" information on the displays during the conduct of the flight.

5. Pilot Checking

None.

6. Operational Suitability

The FSB found PlaneView Avionics Software Version "G," as well as the associated AFM change, to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 11. DISPLAY UNIT (DU)-885 MODIFICATION

1. BACKGROUND

In November 2011, the FSB conducted flight evaluations of the DU-885 modification to the GV. The DU-885 modification changes to the GV are as follows:

1) Replaces six DU-880 CRTs with six DU-885 LCDs.
2) Adds two CCDs.
3) Adds a XM Weather receiver.
4) Adds a data loader.
5) Adds the following functions:
   a) Charts. Displays approach charts, airport maps, Standard Instrument Departures (SID), Standard Terminal Arrivals (STAR), and noise procedures on the enhanced 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 (NAVAID) 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).

      NOTE: The Electronic Charts function must have a current terminal chart database loaded on the DU-885s and operable on both DU Nos. 2 and 5 to eliminate the requirement of any additional paper charts or EFB.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- GV.
- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots receiving DU-885 training should have prior experience utilizing the DU-880 system on the GV. Pilots without this experience may require additional training.

4.2 Special Emphasis. None.

4.3 Ground Training. See paragraph 4.5, Differences, below.

4.4 Flight Training. See paragraph 4.5, Differences, below.

4.5 Differences.

4.5.1 Pilots transitioning from the DU-880 to the DU-885 system should be trained on the differences by utilizing a Level C differences training device or higher.

4.5.2 If pilots transition from the DU-885 to the DU-880 system, it should be noted that it has not been evaluated and no training, checking, or currency determinations have been made.

5. PILOT CHECKING

None.

6. OPERATIONAL SUITABILITY

The FSB found that the LCDs, CCDs, and associated functions, as well as the associated AFM change, was found to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 12. HONEYWELL NZ-2000 FMS 6.1 SOFTWARE

1. BACKGROUND

In August and October 2012, the Gulfstream G-IV FSB evaluated the Honeywell NZ-2000 FMS 6.1 Software with SBAS/LPV GPS. The GV FSB determined that the functionality of the NZ-2000 FMS 6.1 in the G-IV was the same as in the GV aircraft and applied the G-IV FSB findings to the GV.

The GV FMS provides lateral and VNAV data to the AT 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 SBAS/LPV approach capabilities. The change from a Global Navigation System Sensor Unit (GNSSU) to a GLSSU for the Gulfstream GV aircraft form the functional differences encompassed in ASC 186 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.
- VNAV temperature compensation (departure, approach, and missed approach).
- Enroute vectored operation.
- Vectors to Final (VTF) approaches.
- FMS-linked chart functionality (for DU-885-equipped aircraft only).
- Automated hold to altitude (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.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- G-V.
- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots receiving initial Honeywell NZ-2000 FMS 6.1 software training should have multiengine transport turbojet aircraft, new generation avionics, high-altitude operations, FMS, or military experience. Pilots without this experience may require additional training.

4.2 Special Emphasis. None.

4.3 Ground Training. See paragraph 4.5, Differences, below.

4.4 Flight Training. See paragraph 4.5, Differences, below.

4.5 Differences. Pilots transitioning to the Honeywell NZ-2000 FMS 6.1 software with SBAS/LPV GPS should be trained on the differences by utilizing a minimum of a Level C training device.

5. Pilot Checking

None.

6. Operational Suitability

The FSB found the Honeywell NZ-2000 FMS 6.1 software with SBAS/LPV GPS, and installation to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 13. HONEYWELL MARK III COMMUNICATIONS MANAGEMENT UNIT (CMU) FOR FUTURE AIR NAVIGATION SYSTEM (FANS) 1/A+

1. BACKGROUND

On September 3, 2015, the Transport Aircraft Long Beach AEG conducted an evaluation of the Honeywell Mark III CMU for FANS 1/A+ (STC ST 06 2014-0026).

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- G-V.
- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots receiving initial Honeywell Mark III CMU for FANS 1/A+ installed by STC ST 06 2014-0026 training should have multiengine transport turbojet aircraft, new generation avionics, high-altitude operations, FMS, or military experience. Pilots without this experience may require additional training.

4.2 Special Emphasis.

- Emphasis on data entry formats for FANS 1/A+.
- Emphasis on proper manual entry of air traffic control (ATC) clearances into the source FMS.
- Emphasis on data entry for emergency mayday, pans, and associated elements.

4.3 Ground Training. Pilots flying GV aircraft equipped with the Honeywell Mark III CMU for FANS 1/A+ (STC ST-06-2014-0026) must undergo training in the areas defined below:

- FANS 1/A+ and Aeronautical Telecommunications Network (ATN) CPLDC.
- Log on – log off.
- Clearances.
- Emergency.
- Request.
- Offset.
- Reports list.
- Message logs.
- Position reporting.

- Automatic Dependent Surveillance-Contract (ADS-C).
- AFMS.
- Pilot's Guide-Mark III CMU with CDU for legacy systems (including NZ 6.1 FANS).
- The current edition of FAA AC 90-117, Data Link Communications.

4.4 Flight Training. See paragraph 4.5, Differences, below.

4.5 Differences.

4.5.1 The minimum pilot training required on the GV for a pilot to upgrade to the Honeywell Mark III CMU for FANS 1/A+ (STC ST-06-2014-0026) is Level C.

5. PILOT CHECKING

Level A.

6. OPERATIONAL SUITABILITY

The FSB found the Honeywell Mark III CMU for FANS 1/A+ (STC ST-06-2014-0026) and the associated AFMS to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 14. HONEYWELL CD-830 CONTROL DISPLAY UNITS (CDU)

1. BACKGROUND

In February 2016, the G-IV FSB participated in an evaluation of the G-IV Honeywell CD-830 CDUs Modification for STC No. ST04037AT-D. The GV FSB determined that the functionality of the Honeywell CD-830 in the G-IV was the same as in the GV aircraft.

In 2016, the certification flight tests were conducted on the GV. Certification credit was given from the G-IV to the GV because of the identical components they shared. The G-IV FSB evaluation follows: February 19, 2016, the G-IV FSB participated in an evaluation of the G-IV Honeywell CD-830 CDU modification for STC No. ST04037AT-D.

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:

a) All line select hard keys will be moved onto the display as touchscreen buttons.
b) All mode keys (PERF, NAV, FPL, PROG, DIR) will be moved from beneath the display to above the display.
c) 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.
d) The new MENU mode will add a Clean Touchscreen (CLEAN TS) line select key, which freezes the touchscreen display for cleaning.
e) The CD-820 BACK and function (FN) hard keys will now appear as touchscreen buttons on the display.
f) 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 relocated beneath the PREV/NEXT keys and their orientation changed to a side-by-side relationship.
g) Airshow video control functions may be accomplished through RTN/ENTER touchscreen buttons at the lower corners of the display.
h) The CD-810/CD-820 DSPLY annunciation will no longer be displayed, as it was a carryover from the CD-800 monochrome display.
i) The CD-820 MSG annunciation will now annunciate as FMS MSG when the FMS has issued a message to the scratchpad.
j) The CD-830 is not intermixable with either the CD-810 or CD-820.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- GV.
- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots receiving initial Honeywell CD-830 CDU training should have multiengine transport turbojet aircraft, new generation avionics, high-altitude operations, FMS, or military experience. Pilots without this experience may require additional training.

4.2 Special Emphasis. None.

4.3 Ground Training.

4.3.1 The GV FSB has determined that the minimum pilot training required on the GV for a pilot to upgrade to the Honeywell CD-830 CDU (STC No. ST04037AT-D) is Level A and would be achieved by issuance and familiarity with Operating Manual and AFMS.

4.4 Flight Training. None.

5. PILOT CHECKING

Level A.

6. OPERATIONAL SUITABILITY

The FSB found the Honeywell CD-830 CDU and the associated AFMS to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 15. PRIMUS ELITE ADVANCED FEATURES (PEAF) MODIFICATION

1. BACKGROUND

In March 2016, the G-IV FSB participated in an evaluation of the G-IV PEAF modification for STC No. ST04297AT-D. The GV FSB determined that the functionality of the PEAF modification for STC No. ST04297AT-D in the G-IV was the same as the GV aircraft.

Certification credit was given from the G-IV to the GV because of the identical components they shared. The G-IV FSB evaluation follows: March 15, 2016, the G-IV FSB participated in an evaluation of the G-IV PEAF modification for STC No. ST04297AT-D) and found it to be operationally suitable. DU-885 PEAF includes the addition of a Synthetic Vision System (SVS). SVS depicts terrain, obstacles, and airports with texture and colors on the PFD. It obtains the data from the TAWS database.

The DU-885 PEAF modification adds the following features to the DU-885 as follows:

- PFD with SVS.
- TCAS added to the enhanced map.
- XM Satellite Weather added Aviation Routine Weather Report (METAR) and Terminal Area Forecast (TAF) features.
- Improved database loading via the DL-100.
- Additional maintenance pages.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- GV.
- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots receiving DU-885 PEAF training should have prior experience utilizing the DU-880 or DU-885 system on the GV. Pilots without this experience may require additional training.

4.2 Special Emphasis. Airspeed tape is reversed on GV-SP PFD.

4.3 Ground Training. See paragraph 4.5, Differences, below.

4.4 Flight Training. See paragraph 4.5, Differences, below.

4.5 Differences.

4.5.1 The minimum training for pilots transitioning from the DU-880 or DU-885 to the DU-885 PEAF modification (STC No. ST04297AT-D) is Level C.

4.5.2 If pilots transition from the DU-885 PEAF to the DU-885 or DU-880 system without PEAF, it should be noted that it has not been evaluated and no training, checking, or currency determinations have been made.

5. PILOT CHECKING

Level A.

6. OPERATIONAL SUITABILITY

The FSB found the PEAF modification and the associated AFMS to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 16. HONEYWELL DISPLAY UNIT (DU)-1310-2

1. BACKGROUND

In March 2018, the FSB evaluated a GV-SP with the Honeywell DU-1310-2 (STC No. ST02672LA) which has the capability of touchscreen functionality to replace the obsolete DU-1310. The upgrade is available in a two-DU and four-DU configuration. The touchscreen functionality was evaluated to supplement the CCD, DC, and MCDU scratch pad entry field.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

- GIV-X.
- GV-SP.

4. PILOT TRAINING

4.1 Experience/Prerequisites. Pilots should be familiar with the use of the CCD. The CCD Display Select button and the CCD Cursor Movement Toggle switch.

4.2 Special Emphasis. Not applicable.

4.3 Ground Training. The initial ground training should include review and thorough understanding of the following documents:

a) AFMS – Touchscreen Operation – Gulfstream GV-SP.
b) Primus Epic Pilot's Guide Supplement to document A28-1146-161, Touch Display for G550.

4.4 Flight Training. Not applicable.

4.5 Differences. Not applicable.

5. PILOT CHECKING

None.

6. OPERATIONAL SUITABILITY

The FSB found the Honeywell DU-1310-2 installation and associated AFMS to be operationally suitable.

An operational suitability determination does not constitute an operational authorization.

APPENDIX 17. VISIONSAFE EMERGENCY VISION ASSURANCE SYSTEM (EVAS) SA17517LA-T FOR THE GV-SP (G550) AIRCRAFT

1. BACKGROUND

The GV-SP (G550) Flight Standardization Board (FSB) conducted an evaluation of the VisionSafe Emergency Vision Assurance System (EVAS) in the GV-SP (G550) simulator at Flight Safety Savannah on September 29, 2022.

The optionally installed VisionSafe EVAS is designed to be used only when smoke is so extreme that it interferes with the view of the primary flight displays. As such, its operation assumes a catastrophic event has already occurred, and EVAS provides a last chance to save the airplane.

When the EVAS Inflatable Vision Unit (IVU) was deployed as designed, in the test conducted, it provided the flight crew with an adequate field of view of the windscreen and the primary flight displays. However, the FSB found that flight crews should not only be aware of how to properly deploy the EVAS IVU unit, but also be made aware of the limitations of using the system during descent, approach and landing with smoke in the cockpit. The following are considered areas of special emphasis that flight crews must be made aware of.

In addition to viewing the EVAS Training Video, training must include the following:

1) Must review the Airplane Flight Supplement Manual (AFMS) to the Gulfstream GV-SP (G550) Airplane Flight Manual, Installation of Emergency Vision Assurance System (EVAS) Models 107STC-049 & 107STC-050.
2) Must review the Airplane Interior Fire/Smoke Fumes checklist in its entirety.
3) Review the following systems, limitations and considerations:
   a) Operation of the Cabin Pressure Control Panel by feel.
   b) Operate the aircraft without access to the Display Control Panel.
   c) Operate the Guidance Panel by feel.
   d) Operate the aircraft without reference to Engine Instruments.
   e) Modify the flight plan, select the approach, and graphically tune the radios using the Cursor Control Device (CCD).
   f) Operate the aircraft without the use of the autopilot and autothrottles.
   g) Consideration of determining the approach speed if unable to input performance data in the FMS MCDU.
   h) Operation of the Ground Spoiler switch on the aft Center Pedestal by feel.
   i) In the event an emergency evacuation is necessary, the flight crew needs to ensure the outflow valve is fully open.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

Not applicable.

4. PILOT TRAINING

4.1 Experience/Prerequisite. The PF must be qualified and current on the GV-SP (G550) aircraft.

4.2 The PM must be:

a) A qualified and current GV-SP (G550) aircraft pilot.

4.3 Special Emphasis Areas.

4.3.1 Pilots must receive special emphasis training in the following areas during initial, recurrent, transition ground training if EVAS is installed:

1) Must review the Airplane Flight Supplement Manual (AFMS) to the Gulfstream GV-SP (G550) Airplane Flight Manual, Installation of Emergency Vision Assurance System (EVAS) Models 107STC-049 & 107STC-050.
2) Must review the Airplane Interior Fire/Smoke Fumes checklist in its entirety.
3) Review the following systems, limitations and considerations:
   a) Operation of the Cabin Pressure Control Panel by feel.
   b) Operate the aircraft without access to the Display Control Panel.
   c) Operate the Guidance Panel by feel.
   d) Operate the aircraft without reference to Engine Instruments.
   e) Modify the flight plan, select the approach, and graphically tune the radios using the Cursor Control Device (CCD).
   f) Operate the aircraft without the use of the autopilot and autothrottles.
   g) Consideration of determining the approach speed if unable to input performance data in the FMS MCDU.
   h) Operation of the Ground Spoiler switch on the aft Center Pedestal by feel.
   i) In the event an emergency evacuation is necessary, the flight crew needs to ensure the outflow valve is fully open.

4.3.2 Pilots must receive special emphasis training in the following areas during flight training:

There are no special emphasis areas.

4.4 Ground Training. Level B Training. At a minimum, the VisionSafe EVAS training video must be reviewed. Flight crews could benefit from a demonstration utilizing a VisionSafe mobile cockpit demonstration unit if available. Training must be accomplished during initial, recurrent, transition, or upgrade training if EVAS is installed in the airplane.

4.5 Flight Training. Not applicable.

5. PILOT CHECKING

Not applicable.

6. PILOT CURRENCY

A review of all listed items for ground training and Special Emphasis Areas must be completely reviewed and properly documented every 24 months if the VisionSafe EVAS is installed on the airplane.

7. OPERATIONAL SUITABILITY

The FSB has determined that the EVAS for the GV-SP (G550) aircraft is operationally suitable under Title 14 of the Code of Federal Regulations (14 CFR) parts 91, 125, and 135.

An operational suitability determination and completion of VisionSafe EVAS for the GV-SP (G550) aircraft training and checking does not constitute an operational authorization.