



U.S. Department of Transportation
Federal Aviation Administration
Washington, D.C.

Flight Standardization Board (FSB) Report

Revision: 3
Date: 10/25/2016

Gulfstream G280

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RECORD OF REVISIONS

Revision Number	Sections	Pages	Date
Original	ALL	Cover, i–iii, 1–27	9/18/2012
1	Appendix 4 and 5	Pages 2, 3, 31–39	07/26/2013
2	Appendix 6	Cover, Pages 2, 3, 4, 6, 40, 41	10/14/2014
3	ALL	ALL	10/25/2016

HIGHLIGHTS OF CHANGE

Revision 3: Steep Approach operations have been added. Various administrative changes throughout the entire document to add consistency with other FAA guidance has been included. Reworded some paragraphs for clarity.

TABLE OF CONTENTS

SECTION	PAGE
RECORD OF REVISIONS.....	2
HIGHLIGHTS OF CHANGE.....	2
TABLE OF CONTENTS	3
1. PURPOSE AND APPLICABILITY.....	5
2. PILOT TYPE RATING REQUIREMENTS.....	7
3. MASTER DIFFERENCE REQUIREMENTS (MDR).....	7
4. OPERATOR DIFFERENCE REQUIREMENTS (ODR) TABLES.....	7
5. FSB SPECIFICATIONS FOR TRAINING.....	7
6. FSB SPECIFICATIONS FOR CHECKING.....	9
7. FSB SPECIFICATIONS FOR CURRENCY.....	10
8. FSB SPECIFICATIONS FOR RECENT EXPERIENCE.....	10
9. AIRCRAFT REGULATORY COMPLIANCE CHECKLIST	10
10. FSB SPECIFICATIONS FOR TRAINING DEVICES AND SIMULATORS.....	10
11. APPLICATION OF FSB REPORT	10
12. ALTERNATE MEANS OF COMPLIANCE	10
13. MISCELLANEOUS.....	11
APPENDIX 1. MASTER DIFFERENCE REQUIREMENTS (MDR) TABLE [Reserved]	12
APPENDIX 2. SAMPLE OPERATOR DIFFERENCE REQUIREMENTS (ODR) TABLES [Reserved].....	13
APPENDIX 3. AIRCRAFT REGULATORY COMPLIANCE CHECKLIST	14
APPENDIX 4. GULFSTREAM G280 HEAD-UP DISPLAY SYSTEM (HUD)	31
APPENDIX 5. GULSFSTREAM G280 ENHANCED VISION SYSTEM (EVS).....	36

TABLE OF CONTENTS

SECTION	PAGE
APPENDIX 6. ROCKWELL COLLINS PLANEVIEW 280 BLOCK 3.6: SVS, FANS-1/A AND ATN (Link 2000+) CPDLC, AND FMS PERFORMANCE DATABASE.....	40
APPENDIX 7. G280 STEEP APPROACH OPERATIONS	43

1. PURPOSE AND APPLICABILITY

- 1.1 This report specifies master training, checking, and currency requirements applicable to crews operating G280 aircraft under 14 CFR parts 91 and 135. Provisions of this report:
 - a) Identify the pilot type rating assigned to the G280,
 - b) Describe any unique requirement applicable to initial, differences, or recurrent training,
 - c) Describe Master Difference Requirements for flightcrews 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 parts 91 and 135, Advisory Circulars (AC), and other operationally related criteria.
- 1.2 This report addresses G280 aircraft as specified in FAA Type Certificate Data Sheet (TCDS) A61NM.
- 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 G280 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 reevaluate and modify sections of this report based on new or revised Advisory Circular material or revisions to 14 CFR parts 91 and 135, aircraft operating experience, or the testing of new or modified aircraft under the provisions of AC 120-53, 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 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 is to be used by the operator as the means of complying with 14 CFR parts 91 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
ADI	Attitude Display Indicator
ADM	Automatic Descent Mode
AEG	Aircraft Evaluation Group
AFM	Airplane Flight Manual
AP	Autopilot
ATN	Aeronautical Telecommunications Network
CCD	Cursor Control Device
CHDO	Certificate-Holding District Office
CPDLC	Controller Pilot Data Link Communications
CRM	Crew Resource Management
DSP	Display Select Panel
DCP	Display Control Panel
DU	Display Unit
EASA	European Aviation Safety Authority
EFB	Electronic Flight Bag
EFIS	Electronic Flight Instrument System
EFVS	Enhanced Flight Vision System
EICAS	Engine Indicating and Crew Alerting System
FANS	Future Air Navigation System
FCP	Flight Control Panel
FMA	Flight Mode Annunciator
FMS	Flight Management System
FPA	Flight Path Angle
FPV	Flight Path Vector
FSB	Flight Standardization Board
HSI	Horizontal Situation Indicator
HUD	Head-Up Display
IRS	Inertial Reference System
MMEL	Master Minimum Equipment List
MCDU	Multi-Function Control Display Units
MDR	Master Differences Requirements
ODR	Operator Differences Requirements
PFD	Primary Flight Display
POI	Principal Operations Inspector
QRH	Quick Reference Handbook
SBAS	Satellite-Based Augmentation System
SMC	Standby Multi-Function Controller
SVS	Synthetic Vision System
TAWS	Terrain Awareness and Warning System

TCAS	Traffic Alert and Collision Avoidance System
TCE	Training Center Evaluator
TCM	Thrust Control Module
TCPM	Training Center Program Manager
VNAV	Vertical Navigation
WOW	Weight on Wheels

2. PILOT TYPE RATING REQUIREMENTS

- 2.1 In accordance with the provisions of 14 CFR part 61, FAA Order 8900.1, and AC 120-53, a new pilot type rating is assigned to the G280 aircraft and is designated “**G280**”.
- 2.3 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 G280 and any other similar type aircraft from Gulfstream or Israel Aerospace Industries.

3. MASTER DIFFERENCE REQUIREMENTS (MDR)

Reserved for future related 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 Future Air Navigation Systems (FANS)/RNP/ANP/CNS/CPDLC/ADS. Flightcrews 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 flightcrews to operate the above system(s) in typical daily operations (requiring their use) should be provided.

5.2 Pilots Initial Training.

5.2.1 G280 ground training is accomplished as specified by 14 CFR § 135.345 and Areas of Emphasis identified in paragraph 5.5.

5.2.2 G280 flight training is accomplished as specified by 14 CFR § 135.347 and Areas of Emphasis identified in paragraph 5.5.

5.2.3 Emergency training is accomplished as specified by 14 CFR § 135.331.

5.2.4 Seat Dependent Tasks training.

The FSB has found the following right seat dependent tasks for the G280:

- Passenger Oxygen System activation (right seat).
- Emergency Landing Gear extension (ELG handle).

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 § 135.351 and Areas of Emphasis identified in paragraph 5.5.

5.4.2 Recurrent Flight Training must include appropriate training in accordance with 14 CFR § 135.351 and Areas of Emphasis identified in paragraph 5.5.

5.5 Areas of Emphasis.

5.5.1 The following areas must be emphasized during ground training:

- Weight and Balance and Performance Planning. In that weight and balance and performance data is widely dispersed within the AFM, emphasized instruction is needed to reinforce the location and application of tabs, charts, and graphs in determining weight and balance and aircraft performance.
- Display Select Panel/Display Control Panel/Cursor Control Device operation and interaction. Many of the menus, displays, and navigation functions are controlled through the DSP/DCP and Cursor Control Device. The various methods of accessing menus (i.e., selecting or configuring displays, inputting data, graphical flight planning) must be emphasized in training such that a crewmember is thoroughly familiar with their function and capabilities.
- Flap setting verification at takeoff. The Takeoff Warning System (TOWS) only warns the pilots of flap settings greater than 22 degrees as power is applied on takeoff. There is no aural or visual warning if the flaps are set incorrectly less than 22 degrees. CRM must emphasize that proper flap settings are selected and verified by both pilots based on calculated takeoff performance.

- Flight Control Modes. It is important that crewmembers thoroughly understand the operation of the aircraft in each of the flight control modes.
- Automatic Descent Mode (ADM) functionality. The G280 has a unique capability to automatically descend in the event of a loss of cabin pressure above 34,000 feet.

5.5.2 The following areas must be emphasized during flight training:

- Flight Control Modes. It is important to thoroughly understand the operation of the aircraft in each of the flight control modes.
- Flap setting verification at takeoff. The Takeoff Warning System (TOWS) only warns the pilots of flap settings greater than 22 degrees as power is applied on takeoff. There is no aural or visual warning if the flaps are set incorrectly less than 22 degrees. CRM must emphasize that proper flap settings are selected and verified by both pilots based on calculated takeoff performance.
- Automatic Descent Mode (ADM) demonstration. The G280 has a unique capability to automatically descend in the event of a loss of cabin pressure above 34,000 feet.
- Thrust Control Module (TCM). Training will include engine failure on takeoff after V_1 with the TCM deactivated so that a pilot can experience the amount of manual rudder control that is necessary to maintain aircraft directional control on takeoff.

5.6 Specific Flight Characteristics for training (see paragraph 6.2 for checking requirements):

- All items listed in paragraph 5.5.2.
- The first indication of an impending stall is activation of the stick shaker.
- Stall prevention and recovery training, including stick pusher, must be accomplished in accordance with the current edition of AC 120-109.

6. FSB SPECIFICATIONS FOR CHECKING

6.1 General. 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 from a No Flap or Non Standard Flap Approach. The FSB has determined that the probability of flap extension failure on the G280 is not extremely remote due to system design. Therefore, demonstration of a no flap approach and landing during pilot certification or a 14 CFR part 135 competency check is required. In accordance with FAA Order 8900.1, when the practical test is conducted in an airplane, versus a 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 G280 other than those already specified in 14 CFR parts 61 and 135.

8. FSB SPECIFICATIONS FOR RECENT EXPERIENCE

The FSB has found no additional “Recent Experience” requirements for the G280 other than those already specified in 14 CFR parts 61 and 135.

9. AIRCRAFT REGULATORY COMPLIANCE CHECKLIST

9.1 Regulatory Compliance Checklist (see Appendix 3).

This list was provided to the FSB by Gulfstream Aerospace to show operational regulatory compliance of the production version G280. It has not been evaluated by the FSB.

10. FSB SPECIFICATIONS FOR TRAINING DEVICES AND SIMULATORS

The FSB has found that devices or simulators approved for use in G280 initial/recurrent training or checking must replicate the G280 in function and fidelity to the degree determined by the level of flight training device (FTD) or full flight simulator (FFS).

11. APPLICATION OF FSB REPORT

11.1 All G280 operators are subject to the provisions of this report. This report becomes effective on the date of approval (see Cover Sheet or Record of Revisions page).

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 provisions 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 part 97). The G280 is considered Category C aircraft for the purposes of determining “straight-in landing weather minima”.

13.2 Forward Observer Seat. The G280 forward observer seat was not evaluated by the FSB, and as such, has not found to be compliant with AC 120-83, nor operationally suitable in terms of meeting the requirements of 14 CFR §135.75(b).

APPENDIX 1

MASTER DIFFERENCE REQUIREMENTS (MDR) TABLE

This section is 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

This list was provided to the FSB by Gulfstream Aerospace Corporation to show operational regulatory compliance of the production version Gulfstream G280. It has not been evaluated by the FSB.

14 CFR Section	Title	Compliance	Remark(s)
§91.9(a)	Compliance with Flight Manual, Markings, and Placard Markings	Operator Responsibility	
§91.9(b)(1)	Availability of Current Airplane Flight Manual in Aircraft	Operator Responsibility	Gulfstream provides a paper version of the Airplane Flight Manual (AFM) and two iPad™ electronic tablets, with the PlaneBook™ application software installed, with each airplane. The PlaneBook™ application software includes the AFM.
§91.9(c)	Identification of Aircraft in Accordance with 14 CFR Part 45	Operator Responsibility	Airplane is provided with identification in accordance with 14 CFR part 45.
§91.103(a)	IFR Flight Planning and Fuel Requirements	Operator Responsibility	Performance planning information for fuel requirements are provided in the Airplane Flight Manual.
§91.103(b)(1)	Preflight Planning Runway Performance Data	Operator Responsibility	Performance planning information for takeoff and landing runway distance data are provided in the Airplane Flight Manual.

14 CFR Section	Title	Compliance	Remark(s)
§91.126(c)	On or In The Vicinity of an Airport in Class G Airspace Minimum Certificated Landing Flap Setting	Operator Responsibility	The normal flap setting for takeoff is 20 degrees, with an alternate takeoff flap setting of 10 degrees. Takeoff performance data for both flaps settings are provided in the Airplane Flight Manual and the Flight Management System.
§91.191	Category II and Category III Manual	Complies	Category II flight testing is complete. Category II Supplement is part of the TC AFM.
§91.203(a) and (b)	Valid Airworthiness Certificate, Flight Permit, Registration Certificate.	Operator Responsibility	The airplane will be delivered with a valid airworthiness certificate.
§91.203(c)	Fuel Tanks in the Passenger/Baggage Compartment	Not Applicable	The Model G280 does not incorporate fuel tanks within the passenger or baggage compartment.
§91.203(d)	Fuel Venting and Exhaust Emissions Requirements	Complies	The Model G280 incorporates two Honeywell AS907-2-1G engines. These have been shown to comply with 14 CFR part 34, reference FAA TCDS E00010LA.
§91.205(a)	Powered Civil Aircraft with Standard Category U.S. Airworthiness Certificates: Instrument and Equipment Requirements: General	Complies	

14 CFR Section	Title	Compliance	Remark(s)
§91.205(b)	Day VFR Equipment	Complies	Complies with the following exceptions: 14 CFR § 91.205(b)(6). The G280 does not incorporate liquid cooled engines. 14 CFR § 91.205(b)(12). The G280 is certificated as adequate for ditching when outfitted in accordance with G250-CGER-0021 Rev C for Life Rafts and G250-CGER-0026 Rev – for Life Vests.
§91.205(c)	Night VFR Equipment	Complies	Exception: 14 CFR § 91.205(c)(6) – The G280 uses circuit breakers for circuit protection for all standard aircraft wiring and avionics equipment. Fuses are not utilized.
§91.205(d)	IFR Equipment	Complies	
§91.205(e)	Flight at and Above FL 240	Complies	
§91.205(f)	Category II Operations	Complies	Category II flight testing is complete. Category II Supplement is part of the TC AFM.
§91.205(g)	Category III Operations	Not Applicable	The G280 will not pursue Category III capability.

14 CFR Section	Title	Compliance	Remark(s)
§91.207(a) and (b)	Emergency Locator Transmitter (ELT)	Complies	
§91.207(c)	Emergency Locator Transmitter (ELT) Batteries	Operator Responsibility	
§91.207(d)	Emergency Locator Transmitter (ELT) Maintenance	Operator Responsibility	
§91.209(b)	Operate an aircraft equipped with an anti-collision light system.	Operator Responsibility	
§91.211	Supplemental Oxygen: General	Operator Responsibility	The G280 is equipped with an Oxygen system that provides oxygen to each occupant when a loss of cabin pressurization has occurred.
§91.213	Inoperative Instruments and Equipment	Operator Responsibility	The FAA provides a Master Minimum Equipment List (MMEL) document. Gulfstream provides a Maintenance/Operational/Placarding/Procedures (MOPP) Manual.
§91.215	ATC Transponder and Altitude Reporting Equipment and Use	Operator Responsibility	Airplane complies with 14 CFR § 91.215(a).
§91.217	Data Correspondence Between Automatically Reported Pressure Altitude Data and the Pilot's Altitude Reference: ATC Directed Deviation	Operator Responsibility	Airplane complies with 14 CFR § 91.217(a)(3).

14 CFR Section	Title	Compliance	Remark(s)
§91.221	Traffic Alert and Collision Avoidance System (TCAS) Equipment and Use	Operator Responsibility	Airplane complies with 14 CFR § 91.221(a).
§91.223(a)	Terrain Awareness and Warning System (TAWS)	Operator Responsibility	Airplane is equipped with an approved terrain awareness and warning system that as a minimum meets the requirements for Class A equipment in Technical Standard Order (TSO)-C151.
§91.223(b)	Terrain Awareness and Warning System (TAWS)	Not Applicable	
§91.223(c)	AFM Procedures for TAWS	Complies	
§91.223(d)	Exceptions to TAWS	Not applicable	
§91.409(a), (b), (c), and (d)	Inspections	Operator Responsibility	
§91.409(e)	Inspection	Operator Responsibility	
§91.409(f), (g), and (h)	Inspection	Operator Responsibility	The aircraft is delivered with a set of maintenance manuals that provide inspections and inspection intervals.

14 CFR Section	Title	Compliance	Remark(s)
§91.411	Altimeter System and Altitude Reporting Equipment Tests and Inspections	Operator Responsibility	
§91.413	ATC Transponder Tests and Inspections	Operator Responsibility	
§91.503	Flying Equipment and Operating Information.	Operator Responsibility	The G280 is delivered with two flashlights, which are installed in the cockpit, as required by 14 CFR § 91.503(a)(1). An Airplane Flight Manual is provided that supplies a cockpit checklist as required by 14 CFR § 91.503(a)(2). Airplane Flight Manual provides information required by 14 CFR § 91.503(b)(c).
§91.505	Familiarity with Operating Limitations and Emergency Equipment	Operator Responsibility	
§91.507	Equipment Requirement: Over the Top, or Night VFR Operations	Operator Responsibility	Airplane design complies with equipment requirements.
§91.509	Survival Equipment for Overwater Operations	Operator Responsibility	Airplane design complies with 14 CFR § 91.509(b)(5).
§91.511	Radio Equipment for Overwater Operations	Operator Responsibility	Airplane design complies with equipment requirements.

14 CFR Section	Title	Compliance	Remark(s)
§91.513(a), (b), (c), and (d)	Emergency Equipment	Operator Responsibility	The airplane is equipped with emergency equipment and has inspection intervals listed in the Aircraft Maintenance Manual as required by 14 CFR § 91.513(a)(b). The airplane is equipped with fire extinguishers and meets the requirements of 14 CFR § 91.513(c). The airplane is equipped with first aid kits as required by 14 CFR § 91.513(d).
§91.513(e) and (f)	Emergency Equipment	Not Applicable	
§91.517(a)	Passenger Information	Complies	The aircraft is delivered with compliant signage.
§91.517(b)	Passenger Information	Operator Responsibility	
§91.517(c), (d), and (e)	Passenger Information	Operator Responsibility	
§91.519	Passenger Briefing	Operator Responsibility	
§91.521(a)	Shoulder Harness	Complies	Reference TSO C127(a)

14 CFR Section	Title	Compliance	Remark(s)
§91.521(b)	Shoulder Harness	Complies	Reference TSO C127(a)
§91.525	Carriage of Cargo	Operator Responsibility	Airplane is equipped with a baggage compartment located at the aft portion of the pressurized cabin and is accessible with the airplane in flight below 40,000 feet.
§91.527	Operating in Icing Conditions	Operator Responsibility	Airplane certification includes flight into icing conditions.
§91.531	Second in Command Requirements	Operator Responsibility	Airplane certification includes limitation requiring minimum flightcrew of pilot and copilot.
§91.603	Aural Speed Warning Device	Complies	
§91.605(a)	Transport Category Civil Airplane Weight Limitations	Operator Responsibility	Airplane performance data are provided in the Airplane Flight Manual.
§91.605(b) and (c)	Transport Category Civil Airplane Weight Limitations	Operator Responsibility	Airplane performance data are provided in the Airplane Flight Manual.
§91.609(a) and (b)	Operation with Inactive Flight Data Recorder or Cockpit Voice Recorder	Operator Responsibility	

14 CFR Section	Title	Compliance	Remark(s)
§91.609(c) and (d)	Requirements for Flight Data Recorder - 10+ passengers	Complies	
§91.609(e) and (f)	Requirement for Cockpit Voice Recorder	Complies	
§91.609(g)	Accident Reporting	Operator Responsibility	
§91.609(i)	Requirement for Cockpit Voice Recorder	Complies	
§91.609(j)	Requirement for Recording Datalink Messages	Complies	
§91.613(a)	Materials for Compartment Interiors	Not Applicable	
§91.613(b)	Materials for Compartment Interiors	Complies	
§91.853	Operating Noise Limits for Civil Subsonic Airplanes	Complies	G280 is Stage IV Noise Compliant.

14 CFR Section	Title	Compliance	Remark(s)
§91.1033(a)(1), (a)(2), (b), and (c)	Cockpit Checklist	Operator Responsibility	Gulfstream provides a paper version of the Airplane Flight Manual (AFM) and two iPad™ electronic tablets, with the PlaneBook™ application software installed, with each airplane. The PlaneBook™ application software includes the AFM and the Quick Reference Handbook (QRH).
§91.1033(a)(3) and (a)(4)	Aeronautical Charts	Operator Responsibility	
§91.1035(e)	Automated Briefing Recording	Operator Responsibility	The G280 airplane is equipped with the capability to provide recorded briefings.
§91.1035(f)	Passenger Briefing Cards	Operator Responsibility	
§91.1045(b)(1)	Cockpit Voice Recorder	Complies	Reference TSO C-123b and TSO C-155.
§91.1045(b)(2)	Flight Recorder	Complies	Reference TSO C-124b and TSO C-157.
§91.1045(b)(3)	TAWS System	Complies	Reference TSO C-151b.

14 CFR Section	Title	Compliance	Remark(s)
§91.1045(b)(4)	TCAS System	Complies	Reference TSO C-119b.
§91.1045(b)(5)	Airborne Weather Radar Equipment	Complies	Reference TSO C-67.
§91.1115(a)	Minimum Equipment List	Operator Responsibility	The FAA provides a Master Minimum Equipment List (MMEL) document. Gulfstream provides a Maintenance/Operational/Placarding/Procedures (MOPP) Manual.
§91.1411	Continuous Airworthiness Maintenance Program	Operator Responsibility	
91 Appendix A	Category II Operations	Complies	Category II flight testing is complete. Category II Supplement is part of the TC AFM.
91 Appendix C	Operations in the North Atlantic (NAT) Minimum Navigation Performance Specifications (MNPS) Airspace	Operator Responsibility	The G280 airplane navigation performance capability complies with the requirements of Section C91.2.
91 Appendix G	Operations in Reduced Vertical Separation (RVSM) Airspace	Operator Responsibility	The G280 airplane equipment complies with the requirements to operate within RVSM airspace.
§135.21	Manual Requirements	Operator Responsibility	

14 CFR Section	Title	Compliance	Remark(s)
§135.75(b)	Inspector's Credential: Admission to Pilot's Compartment: Forward Observer's Seat.	Complies	
§135.76(b)	DOD Commercial Air Carrier Evaluator's Credentials: Admission to Pilots Compartment: Forward Observer's Seat	Complies	
§135.83(a)(1), (a)(2), (b), and (c)	Cockpit Checklist	Operator Responsibility	Gulfstream provides a paper version of the Airplane Flight Manual (AFM) and two iPad™ electronic tablets, with the PlaneBook™ application software installed, with each airplane. The PlaneBook™ application software includes the AFM and the Quick Reference Handbook (QRH).
§135.83(a)(3) and (a)(4)	Aeronautical Charts	Operator Responsibility	
§135.83(a)(5)	Multiengine Aircraft One-Engine Climb Data	Operator Responsibility	
§135.93	Autopilot: Minimum Altitudes for Use	Operator Responsibility	The G280 AFM specifies the maximum altitude loss for a malfunction of the autopilot.
§135.99	Composition of Flightcrew	Operator Responsibility	Airplane certification includes limitation requiring minimum flightcrew of pilot and copilot.

14 CFR Section	Title	Compliance	Remark(s)
§135.113	Passenger Occupancy of Pilot Seat	Operator Responsibility	
§135.117(e)	Passenger Briefing Cards	Operator Responsibility	
§135.117(f)	Automated Briefing Recording	Operator Responsibility	The G280 airplane is equipped with the capability to provide recorded briefings.
§135.127	Passenger Information	Operator Responsibility	
§135.129(d) and (e)	Exit Seating Passenger Information Cards	Operator Responsibility	
§135.143(a) and (b)	Approved/Operable Instruments and Equipment	Operator Responsibility	
§135.143(c)	ATC Transponder	Complies	
§135.147	Dual Controls Required	Complies	

14 CFR Section	Title	Compliance	Remark(s)
§135.149(a)	Altimeter Adjustable for Barometric Pressure	Complies	
§135.149(c)	Additional Equipment	Complies	
§135.151(a)	Requirement and Installation of CVR	Complies	
§135.151(c)	CVR - Recorded Data	Operator Responsibility	
§135.151(d)	Boom and Mask Microphone	Operator Responsibility	
§135.151(e)	CVR - Recorded Data	Complies	
§135.152	Flight Recorder	Complies	
§135.154	Terrain Awareness and Warning System	Complies	

14 CFR Section	Title	Compliance	Remark(s)
§135.155	Fire Extinguishers: Type and Suitability of Agent	Complies	
§135.157(b)	Oxygen Equipment Requirements Pressurized Aircraft.	Operator Responsibility	Airplane design complies with equipment requirements.
§135.157(c)	Oxygen Equipment Requirements Pressurized Aircraft.	Complies	
§135.158(a)	Pitot Heat Indicating Systems Requirement and Operation	Complies	
§135.159(a) to (g)	Equipment Requirements: Carrying Passengers under VFR at Night or Under VFR Over-The-Top Conditions	Complies	
§135.161	Radio and Navigational Equipment: Aircraft Carrying Passengers Under VFR at Night or Under VFR Over-The-Top	Complies	
§135.163(a) to (e), (g), and (h)	Equipment Requirements: Aircraft Carrying Passengers Under IFR	Complies	
§135.165	Radio and Navigational Equipment: Extended Overwater or IFR Operations	Complies	

14 CFR Section	Title	Compliance	Remark(s)
§135.167	Emergency Equipment: Extended Overwater Operations	Operator Responsibility	
§135.169(a)	Additional Airworthiness Requirements	Complies	.
§135.170(b) and (c)	Materials for Compartment Interiors	Complies	.
§135.171(a)	Shoulder Harness Installation at Flight Crewmember Stations	Complies	
§135.173	Airborne Thunderstorm Detection Equipment	Complies	
§135.175	Airborne Weather Radar Equipment	Complies	
§135.179(a)	Inoperable Instruments and Equipment	Operator Responsibility	The FAA provides a Master Minimum Equipment List (MMEL) document. Gulfstream provides a Maintenance/Operational/Placarding/Procedures (MOPP) Manual.
§135.180(a) and (b)	Traffic Alert and Collision Avoidance System	Complies	.

14 CFR Section	Title	Compliance	Remark(s)
§135.181(a)(2)	Performance Requirements: Aircraft Operated Over-The-Top or in IFR Conditions	Operator Responsibility	
§135.183(c)	Performance Requirements: Land Aircraft Operated Over Water	Operator Responsibility	
§135.185	Empty Weight and Center of Gravity: Currency Requirement	Operator Responsibility	
§135.227(a), (b), (c), (e), and (f)	Icing Conditions: Operating Limitations	Operator Responsibility	
§135.363(b)	Turbine Powered Large Transport Category Airplanes Performance Operating Limitations	Operator Responsibility	
§135.419	Approved Aircraft Inspection Program	Operator Responsibility	
§135.425	Maintenance, Preventive Maintenance, and Alteration Programs	Operator Responsibility	
§135.427(b)	Manual for Maintenance, Preventive Maintenance, and Alterations	Operator Responsibility	

APPENDIX 4

GULFSTREAM G280 HEAD-UP DISPLAY SYSTEM (HUD)

1. BACKGROUND

- 1.1 In April 2013, the Gulfstream G280 Flight Standardization Board (FSB) conducted an evaluation of the Rockwell Collins HGS-6250 Head-up Guidance System (HGS) (hereafter referred to as the Head-Up Display or HUD) installed in a Gulfstream G280 airplane. Based at Gulfstream's Flight Test facility in Savannah, GA, the FSB flew a HUD equipped G280 to evaluate all flight maneuvers and approaches required by the ATP Practical Test Standards. Operations were conducted at many different airports, utilizing visual and instrument procedures during day and night.
- 1.2 The FSB found the Rockwell Collins HGS-6250 installation in the Gulfstream G280 to be operationally suitable for all phases of flight and for U.S. CAT I operations.

2. PREREQUISITES FOR HUD TRAINING

- 2.1 Unless the HUD training is integrated with, or occurs sequentially preceding an initial qualification pilot proficiency check in the G280, a prerequisite to HUD training in a Gulfstream G280 simulator or airplane, is prior training, qualification and currency in the Gulfstream G280.

3. HUD TRAINING - GENERAL

- 3.1 The HUD pilot training requirements consist of those related to initial and recurrent ground and flight training. It should be noted that the HUD training program focuses principally upon training events flown in the left seat by the Pilot-In-Command (PIC) as Pilot Flying (PF). Nevertheless, training of Pilot Monitoring (PM) duties in the right seat during HUD operations is required where procedural differences for the PM are evident. Second-In-Command HUD familiarization flown in the left seat is recommended.
- 3.2 Flightcrew member training must be accomplished using a G280 Level C simulator with a daylight visual display, or a G-280 Level D simulator, or a G280 aircraft, equipped with a Rockwell Collins HGS-6250. The FSB has determined that a PIC should receive a minimum of 3 hours of HUD ground school training, followed by a minimum of 3 hours of HUD flight training, in the left seat, in either an approved G280 Level C or D simulator or G280 aircraft. (The 3 hours of ground and 3 hours of flight training is an initial requirement only.)
- 3.3 A person who progresses satisfactorily through flight training and is determined to be adequately trained and certified proficient by the instructor need not complete the recommended 3 hours of flight training.

4. HUD INITIAL GROUND TRAINING

4.1 Initial HUD ground training program should include the following elements:

- a) Classroom instruction covering HGS-6250 description including use of the HUD Combiner Control Panel, Display Unit (DU) HUD Control Display and Standby Multi-Function Controller (SMC) HUD Control Displays, variations of HUD displays and modes, HUD symbology in all areas of the Combiner, including Non-Normal symbology, Pilot yoke control of HUD display, normal and abnormal HUD AFMS procedures, and pilot briefings, callouts, duties during HUD operations.
- b) Classroom instruction or Computer-Based Training (CBT) on the HUD symbology set and its inter-relationship with airplane aerodynamics, inertial factors, environmental conditions, and comparison to the Primary Flight Display (PFD) during typical flight profiles. Profiles should include:
 - (1) Takeoff Ground Roll,
 - (2) Initial Climb,
 - (3) Climbing Turn,
 - (4) Level Flight,
 - (5) Level Turn,
 - (6) Descent,
 - (7) Descending Turn,
 - (8) ILS Intercept,
 - (9) ILS Approach,
 - (10) Flare/Touchdown, and
 - (11) Unusual Attitudes.
- c) HUD appropriate courseware, such as the current FAA Approved Gulfstream G280 HUD/EVS Aircraft Flight Manual Supplement (AFMS), HGS-6250 pilot guide, or equivalent materials which explain HUD limitations, modes of operation, descriptions of HUD symbology, limit conditions and failures, and which define crew procedures that delineate PF and PM duties, responsibilities, and call-outs during all phases of flight in which HUD operations are conducted.

4.2 Special Emphasis ground training shall be conducted in the following areas:

- a) Crew Coordination,
- b) Crew Briefings and Callouts, and
- c) HUD failure annunciations and abnormal procedures.

5. HUD INITIAL FLIGHT/SIMULATOR TRAINING

5.1 Unless integrated with G280 initial type rating training, flight training dedicated to HUD familiarization and proficiency is in addition to other required training elements.

5.2 All required approaches utilizing the HUD should begin no closer than the final approach fix (FAF) or glideslope intercept for instrument approaches, and should begin no closer than approximately 1,000 feet AGL (3 to 4 NM) to the runway threshold for visual approaches.

5.3 The following HUD flight training program is considered as a minimum training requirement only.

a) Ground Operations:

- (1) Deployment and stowage of HUD, and
- (2) Taxi using HUD under various lighting and visibility conditions.

b) Airwork:

- (1) Straight and level flight, accelerations, and decelerations,
- (2) Normal and steep turns, climbs, and descents,
- (3) Wind Effects on HUD display,
- (4) Approach to stall recovery, and
- (5) Recovery from unusual attitudes.

c) Visual Takeoffs, Approaches, and Landings:

- (1) Low visibility takeoffs,
- (2) Crosswind takeoffs and landings,
- (3) Visual approaches to runways at night with minimal lighting (“black hole” approaches) and use of FPV and Reference FPA Line to achieve desired descent angle,
- (4) Engine failure on takeoff,
- (5) One Engine Inoperative (OEI) landing, and
- (6) OEI go-around.

d) Instrument Approaches:

- (1) Precision and non-precision approaches to the lowest authorized minima, including an approach and landing with OEI,
- (2) Missed approach OEI, and
- (3) SBAS approaches and circling approaches (if authorized).

NOTE: It is desirable to fly visual and instrument approaches with dissimilar approach and lighting systems.

e) Abnormal/Emergency Operations: (as applicable)

- (1) Wind shear escape,
- (2) TAWS escape,
- (3) TCAS Resolution Advisory, and
- (4) HUD or HUD component failures on approach and its effect on pilot workload and PF/PM duties and responsibilities.

5.4 Special emphasis flight training shall be conducted in the following areas:

- a) HUD symbology with the autopilot and flight director both off and on, use and purpose of the Flight Path Vector (FPV), Flight Director Guidance cue, acceleration cue, speed error indications, flight mode annunciator, and use of non-conformal symbology.
- b) Importance of the “design eye position for viewing all HUD symbology.
- c) Use of the Pitch Limit Indicator (PLI) for approach to stall awareness and its use during stall recoveries.
- d) Transitioning to/from the Normal HUD display to the Unusual Attitude display during unusual attitude recoveries.
- e) Avoidance of fixation on the HUD and the inclusion of Head-Down Displays (HDDs), including EICAS information and other cockpit indications during HUD operations.
- f) Use of the Reference FPA Line and FPV for night visual approaches with no vertical guidance.
- g) HUD brightness and contrast settings for different approach lighting systems.

6. HUD INITIAL CHECKING REQUIREMENTS

6.1 Upon completion of training, a PIC must be certified proficient by an instructor, check pilot, or evaluator. Proficiency certification can be accomplished by the successful completion of the maneuvers found in paragraph 6.2, without instructional assistance or by completing the events during a proficiency check in accordance with 14 CFR parts 61 or 135. The validation can be conducted in a G280 Level C full flight simulator with daylight visual display or a G280 Level D full flight simulator, or on a G280 HUD system equipped G280 aircraft.

6.2 Maneuvers used to certify HUD proficiency include as a minimum:

- a) One takeoff,
- b) One departure procedure,
- c) One instrument approach procedure,
- d) One missed approach, and
- e) One landing.

6.3 SICs should be checked on PM duties during HUD approaches and abnormal procedures.

7. HUD RECURRENT TRAINING REQUIREMENTS

7.1 Selected HUD related ground training subjects as outlined in paragraph 4 above should be reviewed on a recurrent basis.

- 7.2 As a minimum, selected flight training maneuvers as listed below should be reviewed on a recurrent basis:
- a) Stall recognition and recovery,
 - b) Unusual attitude recovery using the Unusual Attitude display,
 - c) Takeoff with engine failure at V_1 ,
 - d) Approach, either precision or non-precision, with missed approach,
 - e) Approach (with crosswind, if available) and landing, and
 - f) Selected abnormal/emergency maneuvers (e.g., HUD AFM procedures, approach and landing with OEI, TCAS RA, TAWS escape).

8. HUD RECURRENT CHECKING REQUIREMENTS

- 8.1 At least annually, in conjunction with a pilot-in command proficiency check required by 14 CFR part 61 or 14 CFR part 135, a PIC must demonstrate proficiency using the Gulfstream G280 HUD system by satisfactorily performing the maneuvers listed under paragraph 6.2.
- 8.2 At least annually, second-in-command pilots should be evaluated on crew resource management (CRM) responsibilities and procedures as the PM when the pilot-flying (PF) is conducting HUD operations.

9. HUD RECENT FLIGHT EXPERIENCE REQUIREMENTS

The FSB has determined that there are no recent flight experience requirements for a pilot who has received initial or recurrent HUD training. However, operators are encouraged to regularly utilize the HUD systems to aid in the familiarity of equipment and its limitations.

APPENDIX 5

GULFSTREAM G280 ENHANCED VISION SYSTEM (EVS)

1. BACKGROUND

- 1.1 In April 2013, the Gulfstream G280 Flight Standardization Board (FSB) evaluated the G280 Enhanced Vision System (EVS) that is projected onto a Gulfstream G280 Head-Up Display (HUD). This system, when installed in a G280 aircraft, meets all the requirements of 14 CFR § 91.175(m) as an Enhanced Flight Vision System (EFVS).
- 1.2 Dependent upon environmental conditions, the FSB found this installation operationally suitable for providing situational awareness for the crew during ground and flight operations and for conducting operations in accordance with 14 CFR § 91.175 (l) and (m).

2 PREREQUISITES FOR EVS TRAINING

- 2.1 As a prerequisite for EVS training, pilots must have successfully completed G280 HUD training in a Gulfstream G280 Level C or D simulator, or G280 aircraft. The EVS requirements established in this appendix assume that a pilot entering an EVS training program is trained and proficient in the use of the G280 HUD.

NOTE: EVS imagery on the HUD may be displayed during initial HUD training for purposes of EVS familiarization. However, such familiarization is not creditable toward EVS training as specified in this Appendix.

3 EVS TRAINING - GENERAL

- 3.1 The EVS pilot training requirements consist of those related to initial and recurrent ground and flight training. It should be noted that the EVS training programs focus principally upon training events flown in the left seat by the Pilot-In-Command (PIC) as the Pilot Flying (PF). Nevertheless, EVS training in the duties of the Pilot Monitoring (PM) in the right seat is required. SIC EVS familiarization flown in the left seat is recommended.
- 3.2 Flightcrew member training must be accomplished using a G280 Level C simulator with a daylight visual display, or a G280 Level D simulator, or a G280 aircraft equipped with a G280 Enhanced Vision System. The FSB has determined that each pilot in command should receive a minimum of 2 hours of EVS ground school training, followed by a minimum of 2 hours of EVS flight training, in the left seat, in either an approved G280 Level C or D simulator or G280 aircraft. (The 2 hours of ground and 2 hours of flight training is an initial training requirement only.)

4 EVS INITIAL GROUND TRAINING

4.1 The initial ground training program should include the following elements:

- a) Classroom instruction covering EVS system description, operational concepts, crew duties and responsibilities and operational procedures including preflight, normal and abnormal procedures, EVS annunciations, AFMS guidance, checklists, and EVS failure modes.
- b) Classroom instruction or Computer-Based Training (CBT) on the effect of environmental conditions on EVS imagery and comparison of the EVS imagery to that of the copilot's Multifunction Display (MFD) EVS video.
- c) A G280 EVS Pilot Guide, HUD/EVS Aircraft Flight Manual Supplement (AFMS), or equivalent training materials which explain EVS components, limitations, modes of operation, EVS annunciations, limit conditions and failures, and which define crew procedures that delineate PF and PM duties, responsibilities, and call-outs during all phases of flight in which EVS operations are anticipated.

4.2 Special emphasis ground training shall be conducted in the following areas:

- a) Crew briefings, coordination, and callouts.
- b) Duties of PF and PM.
- c) Transition from EVS imagery to non-EVS visual conditions. (Maximum use should be made of videos of actual HUD/EVS approaches, if available. The relative luminosity between infrared imagery and that of approach lighting systems should be identified.)
- d) EVS Visual anomalies such as "noise", "blooming", and "fireplace effect" in rain.
- e) Appropriate use of the pilot yoke clear switch and use of video brightness and contrast knobs on HUD Combiner Control Panel.
- f) Operation of HUD Display Unit (DU) and Standby Multi-Function Controller (SMC) controls (for EVS), EVS Align Controls, EVS Heat, and Non-Uniformity Correction (NUC) functions.
- g) Importance of the "design eye position in acquiring the proper EVS image.
- h) Importance of cross-checking the HUD instrumentation presentations against the EVS visual scene to enable the pilot to recognize malfunctions of the ground-based navigational equipment and improper presentation of elements in the visual scene during an approach.
- i) Limitations of the IR sensor (e.g., thermal crossover, LED lights).
- j) Importance of vertical guidance to enhance situation awareness with respect to obstacle environment.
- k) Instruction in the use of the autopilot with autothrottle coupled approaches allowing for better pilot monitoring of the EVS image.
- l) Effective monitoring by PM of EVS imagery presented on the MFD.

5 EVS INITIAL FLIGHT/SIMULATOR TRAINING

- 5.1 Unless integrated with initial type rating training, flight training dedicated to EVS familiarization and proficiency is in addition to other required training elements.
- 5.2 All required approaches utilizing the EVS should begin no closer than the final approach fix (FAF) or glideslope intercept for instrument approaches and should begin no closer than approximately 1,000 feet AGL (3 to 4 NM) to the runway threshold for visual approaches.
- 5.3 The following EVS flight training program should be considered as a minimum training requirement only.

a) Ground Operations:

- (1) Initialization of EVS, including operation of EVS brightness and contrast controls, and
- (2) Taxi using EVS under various lighting and visibility conditions.

b) Airwork:

There is no requirement for airwork training using EVS.

c) EVS Takeoffs, Approaches, and Landings:

- (1) Normal takeoff and landing with crosswinds,
- (2) Low Visibility Takeoff (minimum RVR), and
- (3) Visual approaches at night with minimal lighting.

d) Instrument Approaches: (IFR/VFR day and night conditions)

- (1) Precision and non-precision straight-in approaches to the lowest published minima with missed approaches or landings, and
- (2) Precision and non-precision straight-in approaches to lowest published minima with acquisition of sufficient EVS visibility to continue to 100 feet above Touchdown Zone Elevation (TDZE). Acquisition of required visual references below 100 feet TDZE without the aid of EVS, followed by a landing or missed approach.

e) Abnormal/Emergency Operations:

- (1) Failure of EVS during approach, and
- (2) Failure of EVS below published minima but above 100 feet TDZE.

- 5.4 Special emphasis flight training shall be conducted in the following areas:

- a) Proper use and setting of HUD and EVS contrast and video brightness controls for various ambient conditions,

- b) Crew briefings and callouts with emphasis on the duties of the PF and pilot monitoring,
- c) Importance of the “design eye position” in acquiring the proper EVS image,
- d) Manual and Auto NUC functions,
- e) Use of the pilot yoke EVS clear switch, and
- f) Continuation of the approach to 100 feet above TDZE in accordance with 14 CFR § 91.175(l).

6 EVS INITIAL CHECKING REQUIREMENTS

- 6.1 Checking requires a PIC proficiency check conducted in a Level C simulator or Level D simulator that has been qualified by the National Simulator Program for HUD and EVS, or on a HUD and EVS equipped G280 aircraft. This proficiency check may be taken in conjunction with a pilot proficiency check conducted in accordance with 14 CFR parts 61 or 135 or may be administered as a separate test.
- 6.2 Maneuvers to be evaluated during the EVS proficiency check include as a minimum:
- a) One instrument approach and landing with acquisition of the EVS image before published minima and acquisition of required visual references without the aid of EVS below 100 feet above TDZE, and
 - b) One instrument approach with acquisition of the EVS visibility before published minima and failure of the EVS or loss of the EVS image below published minima requiring a missed approach above 100 feet above TDZE.
- 6.3 SICs must be checked on PM duties during EVS approaches and emergencies.

7 EVS RECURRENT TRAINING REQUIREMENTS

- 7.1 Selected EVS related ground training subjects as outlined in Paragraph 4 above must be reviewed annually and documented in a manner acceptable to the Administrator.
- 7.2 At least annually, in conjunction with a pilot-in-command proficiency check required by 14 CFR § 61.58 or 14 CFR § 135.297, a PIC must demonstrate proficiency using the G280 Enhanced Vision System by satisfactorily performing the maneuvers listed under paragraph 6.2.
- 7.3 At least annually, second-in-command pilots must be evaluated on crew resource management (CRM) responsibilities and procedures as the PM when the PF is conducting EVS operations.

8 EVS RECENT FLIGHT EXPERIENCE REQUIREMENTS

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

ROCKWELL COLLINS PLANEVIEW 280 BLOCK 3.6: SVS, FANS-1/A AND ATN (Link 2000+) CPDLC, AND FMS PERFORMANCE DATABASE

- 6.1 Rockwell Collins PLANEVIEW 280 Block 3.6 updates the avionics software to include baseline changes to avionics functions in support of SVS, SVS on the PFD, and an FMS performance database:
- a) Synthetic Vision System (SVS) depicts terrain, obstacles, and airports with texture and colors on the displays. The system obtains data from the TAWS database. SVS enhances pilot situational awareness both on the ground and in flight.
 - b) FANS-1/A CPDLC and ATN CPDLC (Link 2000+) are activated in the G280 to comply with different Global Data Link or EUROCONTROL operational requirements for preferred navigational routes.
 - c) The aircraft performance database is added to the FMS, allowing aircrews to derive a wide spectrum of electronic performance data without manually referencing the AFM or QRH tabs or graphs.
- 6.2 The FSB found the Rockwell Collins PlaneView 280 Block 3.6: SVS, FANS-1/A and ATN (Link 2000+) CPDLC, and FMS performance database upgrades to be operationally suitable.
- 6.3 Training. Pilots flying G280 aircraft with the avionics upgrades described above must undergo training in the areas defined in the table below:

Display Unit Modifications	Synthetic Vision System	FMS Performance Database	FANS-1A and ATN (Link 2000+) CPLDC
Display Allocation options (including Startup)	Architecture and design	Performance Init	Log On – Log Off
¾ PFD Display to include changes to ADI and HSI	Controls	VNAV Setup	Flight Planning
Primary EICAS Appearance (Stacked EICAS)	Symbology (HUD comparable)	Takeoff Performance	Check-in and Clearances
Window Size options	Display Options	VSPEED Postings	Change Requests or Deviations
Vertical Situation Display	Unusual Attitude/TAWS Warnings Display	Obstacle Climb Performance	Transitioning FANS-1A to ATN and back
World View Display	Failure annunciations	Autospeeds	Conditional Clearances
Full Map/Chart Window Display		FMS Data Pages	ADS-C Contract
New SMC MEM Configurations		Constant Speed Targets	Declaring an Emergency
Reversion changes		Equal Time Points (ETP)	

6.4 Special Emphasis Items:

- a) SVS symbology contains elements of HUD symbology. Ensure that pilots whose aircraft do not have HUD are thoroughly instructed in comparable SVS symbology and meaning.
- b) Emphasize the meaning of amber value representations on the PERF pages. Pilots must know what amber values are indicating in terms of performance and how to correct inputs.
- c) Emphasize obstacle climb gradient inputs and results on page 4 of TAKEOFF REF pages.
- d) Emphasize how to setup Autospeeds and VNAV in FMS. Address situations when Autospeeds may “fall out”.
- e) Emphasize how to change VNAV descent and speed in FMS if directed by ATC.
- f) Emphasize the meaning of “Armed” during posting of VSPEEDS.
- g) Emphasize data entry formats for FANS-1/A.

6.5 Training – Checking – Currency Levels:

- a) Level B training is the minimum level of training as determined by the FSB. Computer-Based Training (CBT) was found to be adequate in preparing aircrews for adapting to the new avionics upgrades.
- 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 7

G280 STEEP APPROACH OPERATIONS

BACKGROUND

A Flight Standardization Board (FSB) was convened in August 2016 to evaluate operational suitability and to determine training, checking, and currency requirements for conducting steep approaches in the Gulfstream G280 aircraft. FSB member training and flying took place at Gulfstream Aerospace Corporation's facility in Dallas, Texas, and FlightSafety International in Dallas, Texas. Certification flight testing had been completed prior to the FSB.

Steep approaches in the G280 are defined as those glide paths greater than 4.5 degrees and less than or equal to 5.5 degrees. The G280, as currently configured, is capable of flying steep approaches without modifications to the airframe or changes to the avionics system or flight management system (FMS). The Enhanced Ground Proximity Warning (EGPW) database is able to recognize those airports that support steep approach operations and automatically apply an additional 500 FPM descent rate to the "SINK RATE" alert and 200 FPM to the "PULL-UP" warning alert. Steep approaches must be flown with the speedbrakes extended.

Steep approaches were conducted during day conditions using 5.5 degree approach angles. Two-engine and single-engine steep approaches were flown, terminating either with a landing, or execution of a missed approach or bailed landing procedure. Although steep approaches in the G280 must be conducted with both engines operative, the FSB evaluated piloting skills required to perform a single engine extraction inside the Final Approach Fix (FAF).

OPERATIONAL SUITABILITY ASSESSMENT

The FSB has determined that when coupled to the autopilot and autothrottles, the conduct of steep approaches requires no higher piloting skill level than that of normal (3 degree) approaches. Although the sight picture at flare is definitely steeper, a pilot is able to easily adapt to the slight increase in flare rate, or slight increase in flare altitude as the aircraft is placed in the proper landing attitude. The FSB determined that the use of the HUD is advantageous in executing steep approaches but not mandatory. Use of the autopilot and autothrottles from the Final Approach Fix to the minimum use height of 250 feet above touchdown is mandatory during steep approaches in the G280. Therefore, competence in conducting steep approaches can be achieved through ground training and by flight or simulator training.

PREREQUISITES FOR STEEP APPROACH TRAINING

Unless G280 Steep Approach training is integrated with, or occurs sequentially preceding an initial qualification pilot proficiency check, a prerequisite to Steep Approach training in the G280 is prior training, qualification, and currency in the Gulfstream G280 aircraft.

Any SIC who has been properly qualified in the G280 under 14 CFR § 61.55, 14 CFR part 135, or 14 CFR part 91 subpart K may conduct steep approaches provided the training, checking, and currency requirements of this report have been satisfactorily accomplished.

STEEP APPROACH TRAINING REQUIREMENTS

Ground Training

Ground training must consist of training in the following areas and is appropriate to any flightcrew member position:

1. AFM Supplement review to include Limitations, Procedures, Weight and Balance, Performance, Approach and Landing configuration, Landing flare, Stall Warning, and EPGWS Mode 1 operations.
2. Stages of the Steep Approach to include stabilized approach concept (early configuration including proper airspeed, flap settings, speedbrakes, and landing gear), glideslope capture, flare altitude, and appropriate change in pitch rate.
3. Comparison of the Steep Approach sight picture to that of 3 degree (normal) approach.
4. Pilot Techniques to include early configuration, avoidance of abrupt control inputs, ground rush illusion.
5. Identification of airports with Steep Approaches to include the differences between landing distance data for London City Airport and other airports with steep approaches.

Flight Training

Flight or simulator training is required for G280 steep approaches assuming the ground training described above has been completed.

NOTE 1: If steep approach flight training is desired, it is possible to program the G280 FMS to fly a steep approach to any runway in the navigation database for which a visual approach is available. Unless the airport has a designated steep approach in the FMS database, EGPWS alerts (“SINK RATE”, “PULL-UP”) will be heard in the final phase of the approach and landing (below approximately 400 feet AGL). Steep approach flight training conducted in this manner should only be conducted in visual meteorological conditions. Before each approach, the flight instructor should brief the pilot on the EGPWS alerts that will be activated during the final phase of the approach and landing. The flight instructor should emphasize that for the purpose of flight training only, the pilot should not react to these alerts.

NOTE 2: In that some airports with steep approaches require steep approach experience prior to conducting a steep approach at that airport, practicing approaches at 5.5 degrees may be accomplished by the method described in NOTE 1.

STEEP APPROACH CHECKING REQUIREMENTS

There is no requirement for knowledge checking or flight proficiency testing for G280 steep approach qualification. Proof of completion of G280 steep approach training is sufficient for showing qualification.

STEEP APPROACH RECURRENT REQUIREMENTS

If within the preceding 6 months a pilot has not conducted at least one steep approach, then a review of all the listed items for ground training above must be completed and properly documented prior to conducting steep approach operations.

As a minimum, regardless of the number of steep approaches completed, a review of all ground training items must be accomplished annually and documented in a manner acceptable to the Administrator.