Flight Standardization Board (FSB) Report

Revision: 5  
Date: 02/06/2019

Manufacturer  
Gulfstream Aerospace Corporation

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<tr>
<td>A61NM</td>
<td>G280</td>
<td>Gulfstream G280</td>
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RECORD OF REVISIONS

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HIGHLIGHTS OF CHANGE

**Revision 5:** Revised Appendix 5 to reflect expanded capabilities per regulatory guidelines for EFVS.
1. PURPOSE AND APPLICABILITY

1.1. This report specifies training, checking, and currency requirements applicable to crews operating G280 aircraft under Title 14 of the Code of Federal Regulations (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 Differences Requirements (MDR) for flightcrews requiring differences qualification for mixed fleet flying or differences, if applicable,

d) Provide examples of Operator Differences 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 Federal Aviation Administration (FAA) or operators, and

g) Provide a listing of regulatory compliance status (compliance checklist) for parts 91 and 135, FAA 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 The provisions of this Flight Standardization Board (FSB) report are effective until amended, superseded, or withdrawn by subsequent revisions to this report.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 AC material or revisions to parts 91 and 135, aircraft operating experience, or the testing of new or modified aircraft under the provisions of the current edition of AC 120-53, Guidance for Conducting and Use of Flight Standardization Board Evaluations.

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 parts 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 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:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>14 CFR</td>
<td>Title 14 of the Code of Federal Regulations</td>
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<tr>
<td>AC</td>
<td>Advisory Circular</td>
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<td>ACS</td>
<td>Airman Certification Standards</td>
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<tr>
<td>ADM</td>
<td>Automatic Descent Mode</td>
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<tr>
<td>ADS</td>
<td>Automatic Dependent Surveillance</td>
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<tr>
<td>AFM</td>
<td>Airplane Flight Manual</td>
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<tr>
<td>AFMS</td>
<td>Airplane Flight Manual Supplement</td>
</tr>
<tr>
<td>AGL</td>
<td>Above Ground Level</td>
</tr>
<tr>
<td>ANP</td>
<td>Actual Navigation Performance</td>
</tr>
<tr>
<td>ATC</td>
<td>Air Traffic Control</td>
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<tr>
<td>ATN</td>
<td>Aeronautical Telecommunications Network</td>
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<tr>
<td>ATP</td>
<td>Airline Transport Pilot</td>
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<tr>
<td>CAT</td>
<td>Category</td>
</tr>
<tr>
<td>CBT</td>
<td>Computer-Based Training</td>
</tr>
<tr>
<td>CCD</td>
<td>Cursor Control Device</td>
</tr>
<tr>
<td>CNS</td>
<td>Communication, Navigation, and Surveillance</td>
</tr>
<tr>
<td>CPDLC</td>
<td>Controller-Pilot Data Link Communication</td>
</tr>
<tr>
<td>CRM</td>
<td>Crew Resource Management</td>
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<tr>
<td>DCP</td>
<td>Display Control Panel</td>
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<td>Data Link Communication</td>
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<td>DSP</td>
<td>Display Select Panel</td>
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<td>DU</td>
<td>Display Unit</td>
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<td>EFIS</td>
<td>Electronic Flight Instrument System</td>
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<td>EFVS</td>
<td>Enhanced Flight Vision System</td>
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<td>EGLC</td>
<td>London City Airport</td>
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<tr>
<td>EGPW</td>
<td>Enhanced Ground Proximity Warning System</td>
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<tr>
<td>EICAS</td>
<td>Engine Indicating and Crew Alerting System</td>
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<tr>
<td>ELG</td>
<td>Emergency Landing Gear</td>
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<tr>
<td>EVS</td>
<td>Enhanced Vision System</td>
</tr>
<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
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<tr>
<td>FAF</td>
<td>Final Approach Fix</td>
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<td>FANS</td>
<td>Future Air Navigation System</td>
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<tr>
<td>FD</td>
<td>Flight Director</td>
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<tr>
<td>FFS</td>
<td>Full Flight Simulator</td>
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2. PILOT TYPE RATING REQUIREMENTS

2.1. In accordance with the provisions of 14 CFR part 61, FAA Order 8900.1, Flight Standards Information Management System, and AC 120-53, a new pilot type rating is assigned to the G280 aircraft and is designated “G280”.

2.2. In that this is a new pilot type rating, the FSB did not evaluate, and does not allow for, any training credits, checking credits, currency credits, landing currency credits, or proving test
credits (except that which is permitted by 14 CFR part 135, § 135.145) between the G280 and any other similar type aircraft from Gulfstream or Israel Aerospace Industries.

3. **MASTER DIFFERENCES REQUIREMENTS (MDR)**

Reserved for future related aircraft.

4. **OPERATOR DIFFERENCES 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, Electronic Flight Instrument Systems (EFIS), and flight management systems (FMS). Additional requirements may be appropriate for airmen not having this experience.

   5.1.2 Future Air Navigation System (FANS)/Required Navigation Performance (RNP)/Actual Navigation Performance (ANP)/Communication, Navigation, and Surveillance (CNS)/Controller-Pilot Data Link Communication (CPDLC)/Automatic Dependent Surveillance (ADS). Flightcrews operating aircraft equipped with FANS software should receive appropriate instruction in its general operational functions and appropriate uses for areas of operation, routes, or procedures to be flown. General training should address CNS functions covered by FANS, RNP, and ANP. In addition, sufficient training in use of data link communication (DLC) and 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 § 135.345 and areas of emphasis identified in paragraph 5.5.

   5.2.2 G280 flight training is accomplished as specified by § 135.347 and areas of emphasis identified in paragraph 5.5.

   5.2.3 Emergency training is accomplished as specified by § 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 (ELG) extension (ELG handle).

5.3. Differences Training (§ 135.347).

Reserved for future related aircraft.

5.4. Recurrent Training.

5.4.1 Recurrent ground training must include appropriate training in accordance with § 135.351 and areas of emphasis identified in paragraph 5.5.

5.4.2 Recurrent flight training must include appropriate training in accordance with § 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 (W&B) and performance planning. In that W&B and performance data is widely dispersed within the Airplane Flight Manual (AFM), emphasized instruction is needed to reinforce the location and application of tabs, charts, and graphs in determining W&B and aircraft performance.

- Display select panel (DSP)/display control panel (DCP)/cursor control device (CCD) operation and interaction. Many of the menus, displays, and navigation functions are controlled through the DSP/DCP and CCD. 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. Crew Resource Management (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 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.

- 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 FAA AC 120-109, Stall Prevention and Recovery Training.

6. **FSB SPECIFICATIONS FOR CHECKING**

6.1. General. Checking must be conducted in accordance with part 61, practical test standards (PTS) or Airman Certification Standards (ACS), as applicable, part 135, as applicable, and specific flight characteristics in paragraph 6.2.

6.2. Specific Flight Characteristics (Reference PTS or ACS as Applicable) Landing from a No-Flap or Nonstandard 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 part 135 competency check is required. In accordance with 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 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 parts 61 and 135.

9. **AIRCRAFT REGULATORY COMPLIANCE CHECKLIST**

9.1. Regulatory Compliance Checklist (See Appendix 3, Aircraft Regulatory Compliance Checklist).

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 Page or Record of Revisions).

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 means of compliance is sought, operators must show that the proposed alternate means provides an equivalent level of safety to the provisions of AC 120-53 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. The 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 means of 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 Chair.

13. MISCELLANEOUS

13.1. Landing Minima Categories (Reference 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 been found to be compliant with the current edition of FAA AC 120-83, Flight Deck Observer Seat and Associated Equipment, nor operationally suitable in terms of meeting the requirements of §135.75(b).
APPENDIX 1. MASTER DIFFERENCES REQUIREMENTS (MDR) TABLE

This section is reserved for future related aircraft.
APPENDIX 2. SAMPLE OPERATOR DIFFERENCES REQUIREMENTS (ODR) TABLES

This section is reserved for future related aircraft.
APPENDIX 3. AIRCRAFT REGULATORY COMPLIANCE CHECKLIST

The compliance checklist is kept on file at the Transport Aircraft Long Beach Branch.
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 (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 airline transport pilot (ATP) practical test standards (PTS). Operations were conducted at many different airports, utilizing visual and instrument procedures during day and night.

1.2 The FSB found the HUD installation in the Gulfstream G280 to be operationally suitable for all phases of flight and for U.S. Category (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 (SIC) 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 HUD. 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 HUD description, including use of the HUD combiner control panel, display unit (DU) HUD control display and standby multifunction 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 Airplane Flight Manual Supplement (AFMS) procedures, and pilot briefings, callouts, and duties during HUD operations.

   b) Classroom instruction or computer-based training (CBT) on the HUD symbology set and its interrelationship 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) Instrument landing system (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/enhanced flight vision system (EFVS) AFMS, HUD 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 callouts 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 above ground level (AGL) (3 to 4 nautical miles (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 Flight Path Vector (FPV) and reference Flight Path Angle (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 nonprecision approaches to the lowest authorized minima, including an approach and landing with OEI,
   2) Missed approach OEI, and
   3) Satellite-Based Augmentation System (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) Windshear escape,
   2) Terrain Awareness and Warning System (TAWS) escape,
3) Terrain Awareness and Collision Warning System (TCAS) Resolution Advisory (RA), 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 (FD) both off and on, use and purpose of the FPV, FD guidance cue, acceleration cue, speed error indications, Flight Mode Annunciator (FMA), and use of nonconformal 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 (HDD), including engine indicating and crew alerting system (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 Title 14 of the Code of Federal Regulations (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 (FFS), 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 (IAP),
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 nonprecision, 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 PIC proficiency check required by part 61 or 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, SIC pilots should be evaluated on Crew Resource Management (CRM) responsibilities and procedures as the PM when the 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. GULSFSTREAM G280 ENHANCED FLIGHT VISION SYSTEM (EFVS)

Refer to Title 14 of the Code of Federal Regulations (14 CFR) part 61, § 61.66 for training, recent flight experience, and proficiency requirements for enhanced flight vision system (EFVS) operations. Refer to 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 Flight Standardization Board (FSB) has determined that the Gulfstream Enhanced Vision System (EVS) II EFVS on this aircraft is operationally suitable for EFVS operations defined under § 91.176(a) or (b).

NOTE: An operational suitability determination does not constitute an operational authorization.
APPENDIX 6. ROCKWELL COLLINS PLANEVIEW 280 BLOCK 3.6: SVS, FANS-1/A AND ATN (Link 2000+) CPDLC, AND FMS PERFORMANCE DATABASE

Rockwell Collins PlaneView 280 Block 3.6 updates the avionics software to include baseline changes to avionics functions in support of Synthetic Vision System (SVS), SVS on the primary flight display (PFD), and a flight management system (FMS) performance database:

a) SVS depicts terrain, obstacles, and airports with texture and colors on the displays. The system obtains data from the Terrain Awareness and Warning System (TAWS) database. SVS enhances pilot situational awareness both on the ground and in flight.

b) Future Air Navigation System 1/A (FANS 1/A) Controller-Pilot Data Link Communications (CPDLC) and Aeronautical Telecommunications Network (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 Airplane Flight Manual (AFM) or quick reference handbook (QRH) tabs or graphs.

The Flight Standardization Board (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.

Training. Pilots flying G280 aircraft with the avionics upgrades described above must undergo training in the areas defined in the table below:
<table>
<thead>
<tr>
<th>Display Unit Modifications</th>
<th>Synthetic Vision System</th>
<th>FMS Performance Database</th>
<th>FANS-1A and ATN (Link 2000+) CPLDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display allocation options (including startup)</td>
<td>Architecture and design</td>
<td>Performance init</td>
<td>Log on – log off</td>
</tr>
<tr>
<td>¾ PFD display to include changes to ADI and HSI</td>
<td>Controls</td>
<td>VNAV setup</td>
<td>Flight planning</td>
</tr>
<tr>
<td>Primary EICAS appearance (stacked EICAS)</td>
<td>Symbology (HUD comparable)</td>
<td>Takeoff performance</td>
<td>Check-in and clearances</td>
</tr>
<tr>
<td>Window size options</td>
<td>Display options</td>
<td>VSpeed postings</td>
<td>Change requests or deviations</td>
</tr>
<tr>
<td>Vertical situation display</td>
<td>Unusual attitude/TAWS warnings display</td>
<td>Obstacle climb performance</td>
<td>Transitioning FANS-1A to ATN and back</td>
</tr>
<tr>
<td>World view display</td>
<td>Failure annunciations</td>
<td>Autospeeds</td>
<td>Conditional clearances</td>
</tr>
<tr>
<td>Full map/chart window display</td>
<td></td>
<td>FMS data pages</td>
<td>ADS-C contract</td>
</tr>
<tr>
<td>New SMC MEM configurations</td>
<td></td>
<td>Constant speed targets</td>
<td>Declaring an emergency</td>
</tr>
<tr>
<td>Reversion changes</td>
<td></td>
<td>Equal time points (ETP)</td>
<td></td>
</tr>
</tbody>
</table>

Special Emphasis Items:

a) SVS symbology contains elements of Head-Up Display (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 vertical navigation (VNAV) in FMS. Address situations when Autospeeds may “fall out”.

e) Emphasize how to change VNAV descent and speed in FMS if directed by air traffic control (ATC).

f) Emphasize the meaning of “Armed” during posting of VSpeeds.

g) Emphasize data entry formats for FANS-1/A.
Training, Checking, and 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 System (EGPWS) database is able to recognize those airports that support steep approach operations and automatically apply an additional 500 feet per minute (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 balked 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 extractions 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 Head-Up Display (HUD) is advantageous in executing steep approaches but not mandatory. Use of the autopilot and autothrottles from the FAF 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 second in command (SIC) who has been properly qualified in the G280 under 14 CFR part 61, § 61.55, 14 CFR part 91 subpart K (part 91K), or 14 CFR part 135 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) Airplane Flight Manual Supplement (AFMS) review to include limitations, procedures, Weight and Balance (W&B), 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, and ground rush illusion.

5) Identification of airports with steep approaches to include the differences between landing distance data for London City Airport (EGLC) 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 above ground level (AGL)). Steep approach flight training conducted in this manner should only be conducted in visual meteorological conditions (VMC). 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.