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Flight Standardization Board Report

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Manufacturer
Gulfstream Aerospace Corporation

Type Certificate Data Sheet (TCDS)	TCDS Identifier	Marketing Name	Pilot Type Rating
A61NM	G280	Gulfstream G280	G280

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1. RECORD OF REVISIONS

Revision Number	Section(s)	Page(s) Affected	Date
Original	All	All	9/18/2012
1	Appendices 4 and 5	2, 3, 31 thru 39	07/26/2013
2	Appendix 6	2 thru 4, 6, 40, 41	10/14/2014
3	All	All	10/25/2016
4	Appendices 3 and 5	2 thru 4, 14, removed pages 14 thru 30, 36 thru 39	12/15/2017
5	1, Appendices 3 and 5	5, 6, 14, 20	02/06/2019
6	All	All	09/24/2020

2. INTRODUCTION

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

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

This report lists those determinations for use by:

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

3. HIGHLIGHTS OF CHANGE

The purpose of this revision is to update the format of the G280 Flight Standardization Board Report (FSBR).

4. BACKGROUND

The Transport Aircraft Long Beach AEG formed a Flight Standardization Board (FSB) that evaluated the G280 as defined in FAA Type Certificate Data Sheet (TCDS) No. A61NM. The evaluation was conducted during March and April 2012 using the methods described in

the current edition of FAA Advisory Circular (AC) 120-53, Guidance for Conducting and Use of Flight Standardization Board Evaluations.

In November 2018, the FSB conducted flight evaluations of enhanced flight vision system (EFVS) in a G280. This upgrade expanded capabilities per regulatory guidelines for EFVS. It, as well as the associated Airplane Flight Manual (AFM) change, was found to be operationally suitable. Training, checking, and currency requirements are listed in Appendix 5, G280 Enhanced Flight Vision System (EFVS).

5. ACRONYMS

14 CFR	Title 14 of the Code of Federal Regulations
AC	Advisory Circular
ACFT	Aircraft
ACS	Airman Certification Standards
ADI	Attitude Direction Indicator
ADM	Automatic Descent Mode
ADS-C	Automatic Dependent Surveillance-Contract
AFM	Airplane Flight Manual
AFMS	Airplane Flight Manual Supplement
AGL	Above Ground Level
ATC	Air Traffic Control
ATN	Aeronautical Telecommunications Network
ATP	Airline Transport Pilot
AV	Audiovisual Presentation
CAT	Category
CBT	Computer-Based Training
CPDLC	Controller-Pilot Data Link Communications
CPT	Cockpit Procedures Trainer
CRM	Crew Resource Management
DU	Display Unit
EFVS	Enhanced Flight Vision System
EGPWS	Enhanced Ground Proximity Warning System
EICAS	Engine Indicating and Crew Alerting System
ETP	Equal Time Point
EVS	Enhanced Vision System
FAA	Federal Aviation Administration
FAF	Final Approach Fix
FANS 1/A	Future Air Navigation System 1/A
FD	Flight Director
FFS	Full Flight Simulator
FMA	Flight Mode Annunciator
FMS	Flight Management System
FPA	Flight Path Angle
fpm	Feet Per Minute
FPV	Flight Path Vector
FSB	Flight Standardization Board

FSBR	Flight Standardization Board Report
FTD	Flight Training Device
HDD	Head-Down Display
HGS	Head-Up Guidance System
HO	Handout
HSI	Horizontal Situation Indicator
HUD	Head-Up Display
IAP	Instrument Approach Procedure
ILS	Instrument Landing System
MDR	Master Differences Requirements
MEM	Memory
NAS	National Airspace System
NM	Nautical Mile
OEI	One-Engine-Inoperative
PF	Pilot Flying
PFD	Primary Flight Display
PIC	Pilot in Command
PLI	Pitch Limit Indicator
PM	Pilot Monitoring
PTT	Part Task Trainer
QRH	Quick Reference Handbook
RA	Resolution Advisory
SBAS	Satellite-Based Augmentation System
SIC	Second in Command
SMC	Standby Multifunction Controller
SU	Stand-Up Instruction
SVS	Synthetic Vision System
TAWS	Terrain Awareness and Warning System
TC	Type Certificate
TCAS	Traffic Alert and Collision Avoidance System
TCBI	Tutorial Computer-Based Instruction
TCDS	Type Certificate Data Sheet
TCM	Thrust Control Module
V ₁	Takeoff Decision Speed
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
W&B	Weight and Balance

6. DEFINITIONS

These definitions are for the purposes of this report only.

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

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

- 6.3 Differences Tables.** Describe the differences between a pair of related aircraft, and the minimum levels operators must use to conduct differences training and checking of crewmembers. Differences levels range from A to E.
- 6.4 Master Differences Requirements (MDR).** Specifies the highest training and checking differences levels between a pair of related aircraft derived from the Differences Tables.
- 6.5 Mixed Fleet Flying.** The operation of a base aircraft and one or more related aircraft for which credit may be taken for training, checking, and currency events.
- 6.6 Operational Evaluation.** An AEG determination of pilot type rating, minimum crewmember training, checking and currency requirements, and unique or special airman certification requirements (e.g., specific flight characteristics and no-flap landing).
- 6.7 Operational Suitability.** An AEG determination during certification that an aircraft or system may be used in the National Airspace System (NAS) and meets the applicable operational regulations (e.g., Title 14 of the Code of Federal Regulations (14 CFR) parts 91, 121, 133, and 135).
- 6.8 Qualified.** A crewmember holds the appropriate airman certificate and ratings as required by the applicable operating part.
- 6.9 Related Aircraft.** Any two or more aircraft of the same make with either the same or different type certificates (TC) that have been demonstrated and determined by the Administrator to have commonality.
- 6.10 Seat-Dependent Tasks.** Maneuvers or procedures using controls that are accessible or operable from only one flightcrew member seat.
- 6.11 Special Emphasis Area.** A training requirement unique to the aircraft, based on a system, procedure, or maneuver, which requires additional stress or highlighting during training. It may also require additional training time, specialized training devices, or training equipment.
- 6.12 Specific Flight Characteristics.** A maneuver or procedure with unique handling or performance characteristics that the FSB has determined must be checked.

7. PILOT TYPE RATING

- 7.1 Type Rating.** The G280 type rating designation is G280.
- 7.2 Common Type Ratings.** Not applicable.
- 7.3 Military Equivalent Designations.** Military aircraft that qualify for the G280 type rating can be found at www.faa.gov under “Licenses & Certificates,” “Airmen Certification,” “Online Services,” “Aircraft Type Rating Designators.”

This webpage is kept up-to-date and may be found at https://www.faa.gov/licenses_certificates/airmen_certification/.

8. RELATED AIRCRAFT

8.1 Related Aircraft on Same TCDS. Not applicable.

8.2 Related Aircraft on Different TCDS. Not applicable.

9. PILOT TRAINING

9.1 Airman Experience. Airmen receiving initial G280 training should have multiengine transport turbojet aircraft, new generation avionics, high altitude operations, and flight management system (FMS) experience. Pilots without this experience may require additional training.

9.2 Special Emphasis Areas. Pilots must receive special emphasis on the following areas during ground training:

- a) Crew coordination (initial, recurrent, transition, and upgrade training).
- b) Crew briefings and callouts (initial, recurrent, transition, and upgrade training).
- c) Head-Up Display (HUD) failure annunciations and abnormal procedures (initial, recurrent, transition, and upgrade training).
- d) Flight control modes (initial, transition, and upgrade training).
- e) Flap setting verification at takeoff (initial, transition, and upgrade training).
- f) Automatic Descent Mode (ADM) demonstration (initial, transition, and upgrade training).
- g) Thrust Control Module (TCM) (initial, transition, and upgrade training).

9.3 Specific Flight Characteristics. Maneuvers or procedures required to be checked as referenced in the Airline Transport Pilot (ATP) and Type Rating for Airplane Airman Certification Standards (ACS). There are no specific flight characteristics.

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

- a) HUD (left seat) (initial, recurrent, transition, and upgrade training).
- b) Passenger oxygen system activation (right seat) (initial, recurrent, transition, and upgrade training).
- c) Manual landing gear extension (right seat) (initial, recurrent, transition, and upgrade training).
- d) Nosewheel steering (left seat) (initial, recurrent, transition, and upgrade training).

9.5 Regulatory Training Requirements Which Are Not Applicable to the G280. None.

9.6 Flight Simulation Training Devices (FSTD). EFVS must be trained in a Level C or higher full flight simulator (FFS) in both day and night conditions.

9.7 Training Equipment. There are no specific systems or procedures that are unique to the G280 that require specific training equipment.

9.8 Differences Training Between Related Aircraft. No related aircraft.

10. PILOT CHECKING

10.1 Landing From a No-Flap or Nonstandard Flap Approach. 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 § 61.58 proficiency check, § 91.1065 competency check, or § 135.293 competency check is required.

NOTE: Refer to Order 8900.1, Volume 5, Airman Certification, when the test or check is conducted in an aircraft versus an FFS.

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

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

- a) HUD (left seat) (initial, transition, differences, upgrade, and/or recurrent training).
- b) Nosewheel steering (left seat) (initial, transition, differences, upgrade, and/or recurrent training).

10.4 Other Checking Items.

- a) Precision approach using HUD and EFVS (initial, transition, differences, upgrade, and/or recurrent training).
- b) Localizer performance with vertical guidance (LPV) approach (initial, transition, differences, upgrade, and/or recurrent training).
- c) Steep Approach. When approved for the operator (initial, transition, differences, upgrade, and/or recurrent training).
- d) Second in commands (SIC) should be checked on pilot monitoring (PM) duties during HUD approaches and abnormal procedures.

10.5 FSTDs. EFVS must be checked in minimum of a Level C FFS in both day and night conditions.

10.6 Equipment. There are no specific systems or procedures that are unique to the G280 that require specific equipment.

10.7 Differences Checking Between Related Aircraft. There are no differences checking required.

11. PILOT CURRENCY

Pilots must maintain currency in the following:

- 1) Steep approaches (1 steep approach within 6 months) (PIC and SIC).
- 2) HUD (each item within 6 months) (PIC).
 - a) One takeoff,
 - b) One departure procedure,
 - c) One instrument approach procedure (IAP),
 - d) One missed approach, and
 - e) One landing.

12. OPERATIONAL SUITABILITY

The G280 is operationally suitable for operations under parts 91 and 135.

13. MISCELLANEOUS

13.1 Landing Minima Categories. Refer to 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. The determination of suitability of the forward observer seat for use in conducting enroute inspections or flight checks in accordance with part 135 will need to be determined by the FAA inspector conducting the enroute inspections or flight checks.

13.3 Normal Landing Flaps. The G280 normal final flap setting per § 91.126(c) is LAND Flap setting.

APPENDIX 1. DIFFERENCES LEGENDS

Training Differences Legend

Differences Level	Type	Training Method Examples	Conditions
A	Self-Instruction	<ul style="list-style-type: none"> • Operating manual revision (Handout (HO)) • Flightcrew operating bulletin (HO) 	<ul style="list-style-type: none"> • Crew has already demonstrated understanding on base aircraft (e.g., updated version of engine). • Minor or no procedural changes required. • No safety impact if information is not reviewed or is forgotten (e.g., different engine vibration damping mount). • Once called to attention of crew, the difference is self-evident.
B	Aided Instruction	<ul style="list-style-type: none"> • Audiovisual presentation (AV) • Tutorial computer-based instruction (TCBI) • Stand-up instruction (SU) 	<ul style="list-style-type: none"> • Systems are functionally similar. • Crew understanding required. • Issues need emphasis. • Standard methods of presentation required.
C	Systems Devices	<ul style="list-style-type: none"> • Interactive (full-task) computer-based instruction (ICBI) • Cockpit Procedures Trainers (CPT) • Part task trainers (PTT) • Level 4 or 5 flight training device (FTD 4-5) 	<ul style="list-style-type: none"> • Training can only be accomplished through systems training devices. • Training objectives focus on mastering individual systems, procedures, or tasks versus highly integrated flight operations or “real-time” operations. • Training devices are required to assure attainment or retention of crew skills to accomplish more complex tasks usually related to aircraft systems.
D	Maneuvers Devices	<ul style="list-style-type: none"> • Level 6 or 7 flight training device (FTD 6-7) • Level A or B full flight simulator (FFS A-B) 	<ul style="list-style-type: none"> • Training can only be accomplished in flight maneuver devices in a real-time environment. • Training requires mastery of interrelated skills versus individual skills. • Motion, visual, control-loading, and specific environmental conditions may be required.
E	Level C/D FFS or Aircraft	<ul style="list-style-type: none"> • Level C or D full flight simulator (FFS C-D) • Aircraft (ACFT) 	<ul style="list-style-type: none"> • Motion, visual, control-loading, audio, and specific environmental conditions are required. • Significant full-task differences that require a high fidelity environment. • Usually correlates with significant differences in handling qualities.

Checking Differences Legend

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

APPENDIX 2. MASTER DIFFERENCES REQUIREMENTS (MDR) TABLE

This section is reserved for future-related aircraft.

APPENDIX 3. DIFFERENCES TABLES

This section is reserved for future-related aircraft.

APPENDIX 4. G280 HEAD-UP DISPLAY (HUD) SYSTEM

1. BACKGROUND

- 1.1** In April 2013, the G280 FSB conducted an evaluation of the Rockwell Collins HGS-6250 Head-Up Guidance System (HGS) (hereafter referred to as the HUD) installed in a 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 and Type Rating for Airplane ACS. Operations were conducted at many different airports, utilizing visual and instrument procedures during the day and night.
- 1.2** The FSB found the HUD installation in the G280 to be operationally suitable for all phases of flight and for U.S. Category (CAT) I operations.

2. PREREQUISITES FOR HUD TRAINING

HUD training may be integrated with initial G280 training. HUD training may also be conducted for pilots who were previously trained and qualified in the 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 PM duties in the right seat during HUD operations is required where procedural differences for the PM are evident. SIC HUD familiarization flown in the left seat is recommended.
- 3.2** 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 a G280 Level C or D FFS with a daylight visual or a G280 aircraft. The 3 hours of ground training 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 HUDs and modes, HUD symbology in all areas of the combiner, including non-normal symbology, pilot yoke control of HUD, 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 G280 HUD/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 should be conducted in the following areas:

- Crew coordination,
- Crew briefings and callouts, and
- HUD failure annunciations and abnormal procedures.

5. HUD INITIAL FLIGHT/FFS 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 ft 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,
 - 4) Stall prevention and 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 a variety of approach and lighting systems.

- e) Abnormal/Emergency Operations (as Applicable):
 - 1) Windshear escape,
 - 2) Terrain Awareness and Warning System (TAWS) escape,
 - 3) Traffic Alert and Collision Avoidance 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 should 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 stall prevention and its use during stall recoveries.
- d) Transitioning to/from the normal HUD 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 subparagraph 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 FFS with daylight visual display or a G280 Level D 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 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 prevention 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 G280 HUD system by satisfactorily performing the maneuvers listed under subparagraph 6.2.

8.2 At least annually, SIC pilots should be evaluated on 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. G280 ENHANCED FLIGHT VISION SYSTEM (EFVS)

Refer to 14 CFR part 61, § 61.66 for training, recent flight experience, and proficiency requirements for 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 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, 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 PFD, and an FMS performance database:

- a) 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) 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 AFM or quick reference handbook (QRH) tabs or graphs.

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.

Training. Pilots flying G280 aircraft with the avionics upgrades described above must undergo training in the areas defined in the table below:

DU Modifications	SVS	FMS Performance Database	FANS 1A and ATN (Link 2000+) CPLDC
Display allocation options (including startup)	Architecture and design	PERF INIT	Log on – log off
¾ PFD display to include changes to Attitude Direction Indicator (ADI) and Horizontal Situation Indicator (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	V speed postings	Change requests or deviations
Vertical situation display	Unusual attitude/TAWS warnings display	Obstacle climb performance	Transitioning FANS 1A to ATN and back
Worldview display	Failure annunciations	Autospeeds	Conditional clearances
Full map/chart window display		FMS data pages	Automatic Dependent Surveillance-Contract (ADS-C)
New SMC Memory (MEM) configurations		Constant speed targets	Declaring an emergency
Reversion changes		Equal time points (ETP)	

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 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 V speeds.
- 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. 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) No currency requirement has been determined by the FSB.

APPENDIX 7. G280 STEEP APPROACH OPERATIONS

BACKGROUND

An FSB was convened in August 2016 to evaluate operational suitability and to determine training, checking, and currency requirements for conducting steep approaches in the G280 aircraft. FSB member training and flying took place at Gulfstream Aerospace Corporation's facility in Dallas, Texas, and FlightSafety International, Inc. 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° and less than or equal to 5.5°. The G280, as currently configured, is capable of flying steep approaches without modifications to the airframe or changes to the avionics system or 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° 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 extractions inside the 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°) 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 FAF to the minimum use height of 250 ft 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 FFS training.

PREREQUISITES FOR STEEP APPROACH TRAINING

Steep approach training may be integrated with initial G280 training. Steep approach training may also be conducted for pilots who were previously trained and qualified in the G280.

Any 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) AFMS review to include limitations, procedures, weight and balance (W&B), performance, approach and landing configuration, landing flare, stall warning, and EGPWS 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° (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 FFS 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 ft 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° 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 CURRENCY 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.

STEEP APPROACH RECURRENT TRAINING REQUIREMENTS

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.