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Flight Standardization Board Report

Revision: 2
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Manufacturer
Gulfstream Aerospace LP

Type Certificate Data Sheet (TCDS)	TCDS Identifier	Marketing Name	Pilot Type Rating
A16NM	Gulfstream G150	G150	G150

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1. RECORD OF REVISIONS

Revision Number	Section(s)	Page(s) Affected	Date
Original	All	All	05/22/2006
1	Appendix 3	1 thru 4, 52, 53	07/28/2009
2	All	All	09/02/2020

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 this report.

4. BACKGROUND

The Transport Aircraft Long Beach AEG formed a Flight Standardization Board (FSB) that evaluated the G150 as defined in FAA Type Certificate Data Sheet (TCDS) No. A16NM. The evaluation was conducted during January through February 2006 using the methods described in FAA Advisory Circular (AC) 120-53, Crew Qualification and Pilot Type Rating Requirements for Transport Category Aircraft Operated under FAR Part 121.

In March 2009, the FSB conducted flight evaluations of steep approaches in a G150. This evaluation, as well as the associated Airplane Flight Manual (AFM) change, was found to be operationally suitable. Training, checking, and currency requirements are listed in Appendix 4, Steep Approaches.

5. ACRONYMS

- 14 CFR Title 14 Code of Federal Regulations
- AC Advisory Circular
- ACFT Aircraft
- AEG Aircraft Evaluation Group
- AFM Airplane Flight Manual
- AFMS Airplane Flight Manual Supplement
- AV Audiovisual Presentation
- CCD Cursor Control Device
- CDU Control Display Unit
- CPT Cockpit Procedures Trainer
- DA Decision Altitude
- EFIS Electronic Flight Information System
- EGPWS Enhanced Ground Proximity Warning System
- FAA Federal Aviation Administration
- FFS Full Flight Simulator
- FGS Flight Guidance System
- FMS Flight Management System
- FPM Feet Per Minute
- FSB Flight Standardization Board
- FSTD Flight Simulation Training Device
- FTD Flight Training Device
- HO Handout
- IAI Israel Aerospace Industries
- ICBI Interactive Computer-Based Instruction
- MDR Master Differences Requirements
- MFD Multifunction Display
- NAS National Airspace System
- PFD Primary Flight Display
- POI Principal Operations Inspector
- PTT Part Task Trainer
- SIC Second in Command
- SU Stand-Up Instruction
- TC Type Certificate
- TCAS Traffic Alert and Collision Avoidance System
- TCBI Tutorial Computer-Based Instruction
- TCDS Type Certificate Data Sheet

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 process to determine 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 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 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 Gulfstream Aerospace LP G150 type rating designation is G150.

7.2 Common Type Ratings. Not applicable.

7.3 Military Equivalent Designations. Military aircraft that qualify for the G150 type rating can be found at www.faa.gov under “Licenses & Certificates,” “Airmen Certification,” “Online Services,” “Aircraft Type Rating Designators.” This webpage is kept up-to-date and can be found at https://www.faa.gov/licenses_certificates/airmen_certification/.

8. RELATED AIRCRAFT

8.1 Related Aircraft on Same TCDS. Not applicable.

8.2 Related Aircraft on Different TCDS. Not applicable.

9. PILOT TRAINING.

9.1 Airman Experience. The provisions of this training section apply to the G150, to programs for airmen having previous experience in 14 CFR part 91 or 135 air carrier operations, and multiengine turbojet or turboprop aircraft. Airmen receiving transition G150 training are assumed to have previous experience in multiengine transport turbojet aircraft, new generation avionics, high-altitude operations, and flight management system (FMS) operations. Pilots without this experience may require additional training.

9.2 Special Emphasis Areas.

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

1) FMS (initial training, upgrade training, and transition training).
2) Traffic Alert and Collision Avoidance System (TCAS) (initial training, upgrade training, and transition training).

9.2.1.1 Systems Integration Training.

1) Flight guidance system (FGS) (initial training);
2) Primary flight display (PFD) mode annunciators (initial training);
3) FMS (initial training);
4) Cursor Control Device (CCD) (initial training);
5) Multifunction display (MFD) controls (initial training); and
6) Elevator Trim Systems (normal, override, and emergency) (initial training and recurrent training).

9.2.2 Flight Training (Full Flight Simulator (FFS) - Level C or D and/or Aircraft). Pilots must receive special emphasis on, and perform in the following area during flight training: Dual Generator Failure procedure (initial and recurrent training).

NOTE: The FSB also found that early exposure to the FGS and FMS is important, especially for pilots with no previous Electronic Flight Information System (EFIS) or FMS experience. Establishing early confidence in manually flying the aircraft, converting from manual to automatic (FMS-controlled) flight mode and back is equally important due to heavy reliance on the FGS. In the event of a flight path deviation due to input error or system malfunction, the flightcrew must be able to comfortably transition from automatic to manual mode and back in an orderly fashion.

9.3 Specific Flight Characteristics. There are no specific flight characteristics.

9.4 Seat-Dependent Tasks. Approach and landing from left seat with forward windscreen obscured (using left-side window for forward view) (initial, upgrade, transition, and recurrent training).

9.5 Regulatory Training Requirements Which Are Not Applicable to the G150. None.

9.6 Flight Simulation Training Devices (FSTD). There are no specific systems, procedures, or maneuvers that are unique to the G150 that require a specific FSTD for training.

9.7 Training Equipment. There are no specific systems or procedures that are unique to the G150 that require specific training equipment.

9.8 Differences Training Between Related Aircraft. Not applicable.

10. PILOT CHECKING

10.1 Landing from a No-Flap or Nonstandard Flap Approach. The probability of flap extension failure on the G150 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 61, §§ 61.58 proficiency check, 91.1065 competency check, 125.287 competency check, or 135.293 competency check is required. 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. There are no specific flight characteristics.

10.3 Seat-Dependent Tasks. There are no seat-dependent tasks.

10.4 Other Checking Items. Proficiency in manual and automatic (including FMS) flight in normal, abnormal, and emergency situations must be demonstrated at each proficiency/competency check by all crewmembers that are being checked.

10.5 FSTD. There are no specific systems, procedures, or maneuvers that are unique to the G150 that require a specific FSTD for checking.

10.6 Equipment. There are no specific systems or procedures that are unique to the G150 that require specific equipment.

10.7 Differences Checking Between Related Aircraft. Not applicable.

11. PILOT CURRENCY

11.1 Steep Approaches. If within the preceding 6 months, a pilot has not conducted at least one steep approach, then a review and documentation of all the applicable ground training items must be accomplished.

11.2 Differences Currency Between Related Aircraft. Not applicable.

12. OPERATIONAL SUITABILITY

The G150 is operationally suitable for operations under parts 91, 125, and 135. The FSB determined operational compliance by conducting an evaluation. The list of operating rules evaluated is on file at the Transport Aircraft Long Beach AEG.

13. MISCELLANEOUS

13.1 Landing Minima Categories. Refer to 14 CFR part 97, § 97.3. The G150 is considered as “Category C” aircraft for the purposes of determining straight-in landing weather minima.

APPENDIX 1. DIFFERENCES LEGEND

Training Differences Legend

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

Checking Differences Legend

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

APPENDIX 2. MASTER DIFFERENCES REQUIREMENTS (MDR) TABLE

Not Applicable.

APPENDIX 3. DIFFERENCES TABLES

Not Applicable.

APPENDIX 4. STEEP APPROACHES

BACKGROUND:

An FSB was convened in March 2009 to evaluate operational suitability and to determine training, checking, and currency requirements for conducting steep approaches in the Gulfstream G150 aircraft. FSB member training and flying took place at Gulfstream Aerospace Corporation's facility in Savannah, GA. Certification flight testing was completed prior to the FSB.

Steep approaches in the G150 are defined as those glidepaths greater than 4.5° and less than or equal to 6.0°. The G150, 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. This eliminates the need for any switches or devices on the flight deck to negate nuisance alerts while conducting steep approaches.

The FSB evaluation included numerous steep approaches at Brunswick Golden Isles Airport in Brunswick, GA (KBQK). The FMS was programmed to provide both 5.5° and 6.0° steep approach profiles at that airport. Since KBQK is not one of the airports recognized by the EGPWS database as having steep approaches, sink rate and pull-up alerts were electrically muted while on the approach.

Steep approaches were conducted during day and night conditions using either 5.5° or 6.0°approach angles. Two-engine and single-engine steep approaches were flown, terminating either with a landing, or an execution of a missed approach or balked landing procedure. Although steep approaches in the G150 must be conducted with both engines operative, the FSB evaluated piloting skills required to perform a single-engine extraction should an engine fail at or below decision altitude (DA).

OPERATIONAL SUITABILITY ASSESSMENT:

The FSB has determined that 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.

Therefore, competence in conducting steep approaches can be achieved through ground training alone (as specified by this report), but may be supplemented by flight or FFS training at the option of the operator.

PREREQUISITES FOR STEEP APPROACH TRAINING:

Unless G150 steep approach training is integrated with, or occurs sequentially preceding an initial qualification pilot proficiency check, a prerequisite to steep approach training in the G150, is prior training, qualification, and currency in the Gulfstream G150 aircraft.

Any second in command (SIC) who has been properly qualified in the G150 under § 61.55, part 135, or part 91 subpart K (part 91K) 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 aircrew position:

1. Airplane Flight Manual Supplement (AFMS) Review. To include limitations, procedures, weight and balance, performance, approach and landing configuration, flight director cues, landing flare, stall warning, and EGPWS Mode 1 operations.

2. Stages of the Steep Approach. To include stabilized approach concept (early configuration with slats, flaps, airbrakes, and gear), glideslope capture, flare altitudes, rollout.

3. Comparison of the Steep Approach Sight Picture*. To that of 3.0 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.

   ***** (any ground training course must include either pictorial or video comparisons of both 6.0 and 3.0 approach angles to a representative runway)

   Documentation of completing of G150 steep approach ground training is required.

Flight Training. There is no requirement for flight or FFS training for G150 steep approaches assuming the ground training described above has been completed. This does not preclude an aircrew from conducting training for steep approaches in flight or in an appropriately qualified FFS. This training would supplement the required ground training and would be at the option of the operator.

Some airports require steep approach experience prior to conducting a steep approach at that airport. Practicing approaches at 5.5° or greater may be accomplished by the method described in this paragraph. To conduct steep approach flight training, program the G150 FMS to fly a steep approach to any runway in the navigation database for which a visual approach is available. Load the visual approach to the desired runway, then edit the glideslope angle from the Control Display Unit (CDU) (5.5° or 6.0°). Although 3.0° is the default value, glideslope angles are editable up to 6.9°. Unless the airport has a designated steep approach in the FMS database, EGPWS alerts (“SINK RATE,” “PULL-UP”) will be heard throughout the approach and landing.

STEEP APPROACH CHECKING REQUIREMENTS:

There is no requirement for knowledge checking or flight proficiency testing for G150 steep approach qualification. Proof of completion of G150 steep approach training is sufficient for showing qualification.

STEEP APPROACH RECURRENT TRAINING REQUIREMENTS:

A review of all ground training items must be accomplished annually and documented in a manner acceptable to the Administrator.

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 under ground training above must be completed and properly documented.