Flight Standardization Board (FSB) Report

Revision: 0
Date: 09/14/2018

Manufacturer
Gulfstream Aerospace Corporation

<table>
<thead>
<tr>
<th>Type Certificate Data Sheet (TCDS)</th>
<th>TCDS Identifier</th>
<th>Marketing Name</th>
<th>Pilot Type Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>T00021AT</td>
<td>GVII-G500</td>
<td>G500</td>
<td>GVII</td>
</tr>
</tbody>
</table>

Approved by: Transport Aircraft Long Beach Branch
Federal Aviation Administration (FAA)
Transport Aircraft Long Beach Branch
3960 Paramount Boulevard, Suite 100
Lakewood, CA 90712-4137

Office Telephone: (562) 627-5270
Office Fax: (562) 627-5210
Office Email: 9-AVS-AFS-100@faa.gov
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 RECORD OF REVISIONS</td>
<td>3</td>
</tr>
<tr>
<td>2 INTRODUCTION</td>
<td>3</td>
</tr>
<tr>
<td>3 HIGHLIGHTS OF CHANGE</td>
<td>3</td>
</tr>
<tr>
<td>4 BACKGROUND</td>
<td>3</td>
</tr>
<tr>
<td>5 ACRONYMS</td>
<td>4</td>
</tr>
<tr>
<td>6 DEFINITIONS</td>
<td>5</td>
</tr>
<tr>
<td>7 PILOT TYPE RATING</td>
<td>6</td>
</tr>
<tr>
<td>8 RELATED AIRCRAFT</td>
<td>6</td>
</tr>
<tr>
<td>9 PILOT TRAINING</td>
<td>6</td>
</tr>
<tr>
<td>10 PILOT CHECKING</td>
<td>9</td>
</tr>
<tr>
<td>11 PILOT CURRENCY</td>
<td>10</td>
</tr>
<tr>
<td>12 OPERATIONAL SUITABILITY</td>
<td>10</td>
</tr>
<tr>
<td>13 MISCELLANEOUS</td>
<td>11</td>
</tr>
<tr>
<td>APPENDIX 1. DIFFERENCES LEGEND</td>
<td>12</td>
</tr>
<tr>
<td>APPENDIX 2. MASTER DIFFERENCES REQUIREMENTS (MDR) TABLE</td>
<td>14</td>
</tr>
<tr>
<td>APPENDIX 3. DIFFERENCES TABLES</td>
<td>15</td>
</tr>
</tbody>
</table>
1 RECORD OF REVISIONS

<table>
<thead>
<tr>
<th>Revision Number</th>
<th>Sections(s)</th>
<th>Page(s) Affected</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>All</td>
<td>All</td>
<td>09/14/2018</td>
</tr>
</tbody>
</table>

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

This is the original GVII-G500 Flight Standardization Board (FSB) report.

4 BACKGROUND

The Transport Aircraft Long Beach Branch formed an FSB that evaluated the GVII-G500 as defined in FAA Type Certificate Data Sheet (TCDS) #T00021AT. The evaluation was conducted during June–July 2018 using the methods described in FAA Advisory Circular (AC) 120-53B, Guidance for Conducting and Use of Flight Standardization Board Evaluations.

The GVII-G500 features Fly-by-Wire (FBW) which interface with dual active control sidesticks and is powered by Pratt & Whitney (PW) PurePower PW814GA turbofan engines producing 15,144 pounds of thrust.

The Gulfstream Symmetry Flight Deck based on the Honeywell Primus Epic integrated avionics system with the Smartview Synthetic Vision System (SVS), 2-D and 3-D airport moving maps, and a cockpit display of traffic information, features 10 integrated touchscreens used for system controls, flight management, communications, electronic checklists (ECL), and monitoring of weather and flight information.

The aircraft is equipped with a Head-Up Display (HUD III/Enhanced Vision System (EVS) III) architecture system.
The GVII-G500 is certified to a maximum of 19 passengers and 22 occupants (including one pilot, one co-pilot, and one flight attendant).

Maximum (certified) takeoff weight (MTOW) for the GVII-G500 is 79,600 lbs.

5 ACRONYMS

- 14 CFR  Title 14 of the Code of Federal Regulations
- AC  Advisory Circular
- ACS  Airman Certification Standards
- AEG  Aircraft Evaluation Group
- AFCS  Automatic Flight Control System
- AFM  Airplane Flight Manual
- AT  Autothrottle
- CDL  Configuration Deviation List
- DCN  Data Concentration Network
- DU  Display Unit
- ECL  Electronic Checklist
- EDM  Automatic Emergency Descent Mode
- EFB  Electronic Flight Bag
- EFVS  Enhanced Flight Vision System
- FAA  Federal Aviation Administration
- FD  Flight Director
- FDOS  Flight Deck Observer Seat
- FFS  Full Flight Simulator
- FMS  Flight Management System
- FPV  Flight Path Vector
- FSB  Flight Standardization Board
- FSTD  Flight Simulation Training Device
- HUD  Head-Up Display
- IFIS  Integrated Flight Information System
- LCD  Liquid Crystal Display
- LPV  Localizer Performance with Vertical Guidance
- MDR  Master Differences Requirements
- MMEL  Master Minimum Equipment List
- NAS  National Airspace System
- NWSS  Nose Wheel Steering System
- PTS  Practical Test Standards
- SVS  Synthetic Vision System
- 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. Difference levels range from A to E.

6.4 Master Differences Requirements (MDR). Specifies the highest training and checking difference 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, 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, 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 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 GVII-G500 type rating designation is GVII.

7.2 Common Type Ratings.

Not applicable.

7.3 Military Equivalent Designations. Military aircraft that qualify for the GVII type rating designation can be found on the faa.gov website under Licenses and Certificates, Airmen Certification, Online Services, Aircraft Type Rating Designators. This webpage is kept up-to-date and can be found at http://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 GVII-G500 training will benefit from prior experience operating multi-engine transport turbojet aircraft in accordance with parts 91 or 135. Additionally, a working knowledge of systems, such as Automatic Flight Control System (AFCS), autothrottle (AT), flight management system (FMS), Integrated Flight Information System (IFIS), ECL, Electronic Flight Bags (EFB), HUD, highly integrated avionics systems with electronic flight displays, high altitude operations, military, and FMS experience may be necessary to complete the training in a timely manner. Pilots without this experience may require additional training.

9.2 Special Emphasis Areas.

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

   a) Abnormal/emergency guidance. Gulfstream’s philosophy is to not identify any steps in the GVII-G500 abnormal or emergency procedures as so-called “memory items”. Pilots are expected to perform some initial and critical steps without reference to any documentation. In addition, pilots are expected to don oxygen masks promptly when appropriate (e.g., when smoke is detected). Operators and training providers should ensure pilots are trained accordingly during initial, transition, upgrade, and recurrent training. The following are
examples of procedures that the initial/critical steps should be performed promptly without reference to a checklist:

- Engine fire/auxiliary power unit (APU) fire.
- Engine failure after $V_1$.
- Cabin pressure low/emergency descent.
- Engine exceedance.
- Enhanced ground proximity warning system (EGPWS)/windshear/Traffic Alert and Collision Avoidance System (TCAS) alerts.
- Sidestick fail.
- Ground spoilers armed.
- Brake-by-Wire fail (U) (ground procedures).

b) Crew Alert System (CAS) message philosophy. Must be trained in initial, transition, upgrade, and recurrent training.

c) Data Concentration Network (DCN). This should include instruction on the system architecture, crew actions, and checklist. This should include training on Airplane Flight Manual (AFM) DCN dispatch limitations that take precedence over Master Minimum Equipment List (MMEL) relief. This item must be included in initial, transition, upgrade, and recurrent training.

d) Flight control modes. This aircraft utilizes FBW flight controls. It is important to thoroughly understand the operation of the aircraft in each of the flight control modes. This item must be included in initial, transition, upgrade, and recurrent training.

e) Zero-flap landing, including the effects of the wing anti-ice on stall protection and approach speeds, high idle thrust, and the need to positively fly the nose gear to the runway after main gear touchdown. This item must be included in initial, transition, upgrade, and recurrent training.

f) Location and proper donning of the smoke goggles. Pilots should demonstrate the proper donning of the oxygen mask and smoke goggles in the classroom, flight simulation training device (FSTD), or aircraft during initial, transition, upgrade, and recurrent training.

g) Automatic Emergency Descent Mode (EDM). The Speedbrakes deploy automatically during EDM and should be allowed to do so. When speedbrakes auto-deploy, they do so only after established in the descent when near $V_{MO}/M_{MO}$. This item must be included in initial, transition, upgrade, and recurrent training.

h) Engine operations in icing. Training should include classroom instruction of vibrations, associated odors, and energy management operations with increased idle thrust. This training must be included in initial, transition, upgrade, and recurrent training.
i) Enhanced flight vision system (EFVS) operations. EFVS operations to touchdown and rollout in accordance with part 91, § 91.176(a) have not yet been approved. Such operations are not allowed.

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

a) HUD systems. Relationship between boresight, Flight Path Vector (FPV), flight director (FD) and V-speed awareness band during all engine and single engine takeoff operations. This item must be included in initial, transition, upgrade, and recurrent training.

b) Proper takeoff and rotation technique during all HUD and non-HUD operations. This item must be included in initial, transition, upgrade, and recurrent training.

c) Flight control modes. This aircraft utilizes FBW flight controls. It is important to thoroughly understand the operation of the aircraft in each of the flight control modes. This item must be included in initial, transition, upgrade, and recurrent training.

d) EDM. The Speedbrakes deploy automatically during EDM and should be allowed to do so. When speedbrakes auto-deploy, they do so only after established in the descent when near V_{MO}/M_{MO}. This item must be included in initial, transition, and upgrade training.

e) Location and proper donning of the smoke goggles. Pilots should demonstrate the proper donning of the oxygen mask and smoke goggles in the full flight simulator (FFS) during both initial and recurrent training.

f) Engine operations in icing. Training should include FFS demonstration of vibrations, energy management operations with increased idle thrust, and discussion of possible odor. It is not recommended that this training be conducted in an airplane during flight. This training must be included in initial, transition, upgrade, and recurrent training.

g) Glareshield panels. Use of glareshield panels for night flight. These must be in place for takeoff and landing at night. See Configuration Deviation List (CDL). Training in stowing and deploying. This training must be included in initial, transition, and upgrade training.

h) Nose Wheel Steering System (NWSS) to include rudder pedal authority for both left and right seat. This training must be included in initial, transition, and upgrade training.
9.3 Specific Flight Characteristics.

Maneuvers/procedures required to be checked as referenced in the airline transport pilot (ATP) and type rating practical test standards (PTS) or Airman Certification Standards (ACS), as applicable.

There are no specific flight characteristics.

9.4 Seat Dependent Tasks.

a) HUD (left seat). Initial, upgrade, and recurrent training.

b) EFVS (left seat). Initial, upgrade, and recurrent training.

c) Passenger oxygen system activation (right seat). Initial, transition, upgrade, and recurrent training.

d) NWSS (left seat). Initial, transition, upgrade, and recurrent training.

9.5 Regulatory Training Requirements which are not Applicable to the GVII.

None.

9.6 FSTDs

There are no specific systems, procedures, or maneuvers that are unique to the GVII-G500 that require a specific FSTD for training.

9.7 Training Equipment.

There are no specific systems or procedures that are unique to the GVII-G500 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 GVII-G500 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, 14 CFR part 125, §125.287 competency check, or part 135, § 135.293 competency check is required.

Refer to FAA Order 8900.1, Volume 5 when the test or check is conducted in an aircraft versus an FFS.
10.2 Specific Flight Characteristics.

Maneuvers/procedures required to be checked as referenced in the ATP and type rating PTS or ACS, as applicable.

There are no specific flight characteristics.

10.3 Seat Dependent Tasks.

There are no seat dependent tasks.

10.4 Other Checking Items.

a) Precision approach using HUD and EFVS. Initial and recurrent checking.

b) Localizer performance with vertical guidance (LPV) approach. Initial checking.

10.5 FSTDs.

There are no specific systems, procedures, or maneuvers that are unique to the GVII-G500 that require a specific FSTD for checking.

10.6 Equipment.

There are no specific systems or procedures that are unique to the GVII-G500 that require specific equipment.

10.7 Differences Checking Between Related Aircraft.

Not applicable.

11 PILOT CURRENCY

There are no additional currency requirements for the GVII-G500 other than those already specified in parts 61, 125, and 135.

11.1 Differences Currency Between Related Aircraft.

Not applicable.

12 OPERATIONAL SUITABILITY

The GVII-G500 is operationally suitable for operations under parts 91, 125, and 135. The FSB determined operational compliance by conducting an evaluation of aircraft serial numbers 72003 and 72004 during a series of flights from July 25, 2018, through July 26, 2018. The list of operating rules evaluated is on file at the Transport Aircraft Long Beach Branch.
13 MISCELLANEOUS

13.1 Flightcrew Sleeping Facilities (Part 135).

Flightcrew sleeping facilities have not been evaluated.

13.2 Flight Deck Observer Seat (FDOS).

The FDOS in the GVII-G500 is part of the type certificated (TC) design. The FDOS was evaluated in aircraft serial number 72004 during a 3.5-hour operational suitability flight conducted on July 26, 2018. The FSB has determined that the FDOS meets the requirements of §§ 125.317(b) and 135.75(b) and the current edition of AC 120-83, Flight Deck Observer Seat and Associated Equipment.

13.3 Landing Minima Categories (Reference 14 CFR Part 97, § 97.3).

The GVII-G500 is considered Category C aircraft for the purposes of determining “straight-in landing weather minima.”

13.4 Normal Landing Flaps.

The GVII-G500 normal “final landing flap setting” per § 91.126(c) is flaps 39.
# APPENDIX 1. DIFFERENCES LEGEND

## Training Differences Legend

<table>
<thead>
<tr>
<th>Differences Level</th>
<th>Type</th>
<th>Training Method Examples</th>
<th>Conditions</th>
</tr>
</thead>
</table>
| A                 | Self-Instruction | • Operating manual revision (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

<table>
<thead>
<tr>
<th>Differences Level</th>
<th>Checking Method Examples</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>B</td>
<td>• Oral or written exam</td>
<td>• Individual systems or related groups of systems.</td>
</tr>
<tr>
<td></td>
<td>• Tutorial computer-based instruction self-test (TCBI)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>• Interactive (full-task) computer-based instruction (ICBI)</td>
<td>• Checking can only be accomplished using systems devices.</td>
</tr>
<tr>
<td></td>
<td>• Cockpit procedures trainers (CPT)</td>
<td>• Checking objectives focus on mastering individual systems, procedures, or tasks.</td>
</tr>
<tr>
<td></td>
<td>• Part task trainers (PTT)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Level 4 or 5 flight training device (FTD 4–5)</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>• Level 6 or 7 flight training device (FTD 6–7)</td>
<td>• Checking can only be accomplished in flight maneuver devices in a real-time environment.</td>
</tr>
<tr>
<td></td>
<td>• Level A or B full flight simulator (FFS A–B)</td>
<td>• Checking requires mastery of interrelated skills versus individual skills.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Motion, visual, control loading, and specific environmental conditions may be required.</td>
</tr>
<tr>
<td>E</td>
<td>• Level C or D full flight simulator (FFS C–D)</td>
<td>• Significant full task differences that require a high fidelity environment.</td>
</tr>
<tr>
<td></td>
<td>• Aircraft (ACFT)</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 2. MASTER DIFFERENCES REQUIREMENTS (MDR) TABLE

Not applicable.
APPENDIX 3. DIFFERENCES TABLES

Not applicable.