



## **OPERATIONAL EVALUATION REPORT**

**GULFSTREAM**

**G280**

**GRUPO DE AVALIAÇÃO DE AERONAVES – GAA**

BRAZILIAN AIRCRAFT EVALUATION GROUP

AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL

SÃO JOSÉ DOS CAMPOS, BRAZIL

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# Approval

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# 1 General

## 1.1 Evaluation Team

### 1.1.1. First issue team members

<b>Name</b>	<b>Task</b>	<b>Organization</b>
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Guilherme dos Santos Macedo	Evaluator Inspector	ANAC
Rodrigo de Souza Moraes	Pilot Inspector	ANAC

## 1.2 Acronyms

- AAD – Aeronave de Alto Desempenho
- AEO – All Engine Operative
- AFM – Airplane Flight Manual
- ATO – Approved Training Organization
- CBT – Computer Based Training
- CCD – Cursor Control Device
- CCL – Compliance Checklist
- CRM – Crew Resource Management
- DCP – Display Control Panel
- DU – Display Unit
- EASA – European Air Safety Agency
- EFB – Electronic Flight Bag
- EFIS – Electronic Flight Instrument System
- EGPWS – Enhanced Ground Proximity Warning System
- FAA – Federal Aviation Administration
- FFS – Full Flight Simulator
- FMS – Flight Management System
- FSB – Flight Standardization Board (FAA)
- FSI – Flight Safety International
- FSTD – Flight Simulator Training Device
- FTD – Flight Training Device
- FTO – Flight Training Organization
- GALP – Gulfstream Aerospace Limited Partnership
- GPWS – Ground Proximity Warning System
- HPA – High Performance Aircraft
- HUD – Head Up Guidance Display
- IFR – Instrument Flight Rules
- ISI – Integrated Standby Instrument
- JAR – Joint Aviation Regulations
- LIFUS – Line Flying Under Supervision
- LNAV – Lateral Navigation
- MCDU – Multifunction Control Display Unit
- MFD – Multi-Function Display
- MCR – Master Common Requirements
- MDR – Master Difference Requirements
- MMC – Multi Crew Coordination
- MMEL – Master Minimum Equipment List
- ND – Navigation Display

- ❑ ODR – Operational Difference Requirements
- ❑ OEB – Operational Evaluation Board
- ❑ OEI – One Engine Inoperative
- ❑ OSD – Operational Suitability Data
- ❑ PBN – Performance-Based Navigation
- ❑ PF – Pilot Flying
- ❑ PFD – Primary Flight Display
- ❑ PIC – Pilot In Command
- ❑ PM – Pilot Monitoring
- ❑ PNF – Pilot Not Flying
- ❑ PTH – Pilot Training Handbook
- ❑ QRH – Quick Reference Handbook
- ❑ RBAC – Regulamento Brasileiro de Aviação Civil
- ❑ RBHA – Regulamento Brasileiro de Homologação Aeronáutica
- ❑ RNAV – Area Navigation
- ❑ RNP – Required Navigation Performance
- ❑ SIC – Second In Command
- ❑ SMC – Standby Multifunction Controller
- ❑ SOP – Standard Operating Procedure
- ❑ SVS – Synthetic Vision System
- ❑ TASE – Training Area of Special Emphasis
- ❑ TAWS – Terrain Awareness and Warning System
- ❑ TC – Type Certificate
- ❑ TCAS – Traffic Alert Collision Avoidance System
- ❑ TCDS – Type Certificate Data Sheet
- ❑ TCM – Thrust Compensation Module
- ❑ VNAV – Vertical Navigation
- ❑ WAI – Wing Anti Ice



## 2 Introduction

### 2.1 Background

The evaluation was first conducted by documentation analysis using the information provided by the manufacturer and the determinations of the Operational Evaluation Board (OEB) Report Revision 1, issued by the European Aviation Safety Agency (EASA) on February 13<sup>th</sup>, 2013 and Flight Standardization Board (FSB) Report Revision 2, issued by the Federal Aviation Administration (FAA) on October 14<sup>th</sup>, 2014.

Hence, it was arranged a visit in Gulfstream Aerospace and Flight Safety International in order to perform technical meetings and familiarization flights in Aircraft and FFS level D.

In case more detailed information is required, it is recommended that the OEB and the FSB Reports are consulted.

### 2.2 Objective

This report presents ANAC collection of results obtained from the operational evaluation of Gulfstream aircraft model G280.

### 2.3 Purpose

The purpose of this report is to:

- a. Define the Pilot Type Rating assigned for the G280;
- b. Define the requirements for training, checking and currency applicable to flight crew for the G280 and functionalities;
- c. Describe the required Flight Simulation Training Device (FSTD) for crew training and checking.
- d. Define the areas of special emphasis during a training program

### 2.4 Applicability

This report was concluded before the Brazilian TC issuance for model G280. In case of incompatibility, this report must be revised and the recommendations presented herein should be reevaluated before its application.

This report is applicable to:

- a. Brazilian operators of G280 under RBHA 91 and RBAC 135 rules;
- b. Approved Training Organizations certified under RBAC 142 (Training Centers);
- c. Civil Aviation Inspectors (INSPAC) related to safety oversight of Gulfstream G280;
- d. ANAC Principal Operations Inspectors (POIs) of G280 operators.

## **2.5 Cancellation**

Not applicable.

## 3 Aircraft Specifics

### 3.1 Customization of Procedures and Checklists

The manufacturer has developed procedures to be followed in case of abnormal and emergency situations. It is the manufacturer's philosophy to not identify any steps in these procedures as so-called "Memory Items". Yet pilots are expected to perform some of those initial and critical steps without reference to any documentation. Emergency procedures are an essential part of the training curriculum. **The GAA recommends operators** to establish, as part of their SOP's, which steps of these procedures should be initially performed immediately and without reference to a checklist. Pilots, who are to operate this aircraft without the background of an established operator, should be provided adequate guidance at the earliest possible time during their training.

### 3.2 Forward Observer Seat

The manufacturer defined the forward observer seat as an optional for the G280. It was evaluated by GAA during the familiarization flights and considered satisfactory to enroute inspections.

The closest passenger seat to the cockpit is not suitable for enroute inspections.

In case the optional observer seat is not installed, the POI should evaluate if the operator is complying with RBAC 135.75 (b).

### 3.3 Standby Multifunction Controller (SMC)

The Standby Multifunction Controller (SMC) comprises a Display Select Panel (DSP) and Display Control Panel (DCP). When not being used for flight or system management purposes, the DCP displays the Integrated Standby Instrument (ISI). The ISI provides flight and navigation information to the pilot.

Two SMCs are located on the glare shield, one in front of each pilot. The SMC combines the ISI and a menu control system for other system displays and selections. The crew may manually select the ISI for display on either SMC.

In addition, the following conditions will result in the automatic display of the ISI, without additional crew action:

- Loss or Reversion of a PFD
- Electrical Break Power Transfer (in-flight only)

- PFD to MFD conversion after loss of two DU's
- Cross-side SMC failure
- Attitude Miscompare (PFD-to-PFD or PFD-to-ISI or ISI-to-ISI)
- Altitude Miscompare (PFD-to-PFD or PFD-to-ISI or ISI- to-ISI)
- Heading Miscompare (PFD-to-PFD or PFD-to-ISI)
- Airspeed Miscompare (PFD-to-PFD or PFD-to-ISI)
- Unusual Pitch Attitudes and Bank Angles

The ANAC AFM does not address manual selection of the ISI during any phases of flight. However, **operators should consider any conditions or operational procedures for the flight crew to have one ISI displayed during the takeoff and approach/landing phases of flight when determining their own operational procedures.**

## 4 Pilot Type Rating

GAA recommends that a new license endorsement “**G280**” is applied for the Gulfstream G280 series aircraft and it is recommended the update of ANAC type rating list (Instrução Suplementar – IS 61-004) with the following information translated to Portuguese:

**Table 1 - Pilot Type Rating**

X – Type Rating (Aircraft) – Multi Pilot Operation, Multi Engine				
Manufacturer	Aircraft		RMK	Type Rating
	Model	Name		ANAC
Gulfstream Aerospace LP (GALP)	<b>Gulfstream G280</b>	<b>G280</b>	<b>HPA (AAD)*</b>	<b>G280</b>

\*AAD stands for HPA in Portuguese

As this is a new type rating, the GAA does not recommend for any training credits, checking credits, currency credits, landing currency credits, or proving test credits between the G280 and any other similar type of aircraft from Gulfstream or Israel Aerospace Industries.

## 5 Master Difference Requirements (MDR)

These provisions are applied when there are differences between models which affect crew knowledge, skills, or abilities related to flight safety (e.g., Level A or greater differences) for training, checking and currency, respectively, according to IAC 121-1009.

There is no variant for this model thus the MDR is not applicable in this case.

## **6 Operator Difference Requirements (ODR)**

Not applicable. There is no variant.

## 7 Specifications for Training, Checking and Currency

Specifications for training, checking and currency are detailed on OEB and FSB Reports mentioned above.

### 7.1 Pre Entry Requirements

The G280 is a high performance turbojet aircraft. Its operation is centred on a complex integrated avionics system, including EFIS displays, FMS and automated Flight Guidance and Control systems. Furthermore, the aircraft has advanced warning systems, including TCAS and TAWS. A pilot who meets only the minimum prerequisites, should be considered unfamiliar with these features. Credits may be given to pilots who have experience in multi-engine turbojet aircraft, EFIS, and FMS.

The candidate pilot must, at least:

- Have a flight experience of 1000 hours in airplane;
- Hold a private pilot license – airplane;
- Hold an IFR rating;
- Hold a Land Multiengine Class Rating (MLTE) or a type rating of a multiengine aircraft (without centerline thrust limitation); and
- Have been approved in the theoretical exam of ANAC Airline Transport Pilot License (PLA), or have accumulated flight experience in high altitudes airplanes, or in jet planes; or hold a certificate of an ANAC approved high altitude course.

### 7.2 Theoretical Knowledge

The theoretical knowledge curriculum should be the same for pilot-in-command or co-pilot training, and regardless of whether the practical training is performed in an FFS or the aircraft.

Theoretical knowledge training and checking must provide for adequate knowledge and understanding of the aircraft systems and, in addition, should ensure satisfactory knowledge and understanding of outfitted systems common to other aircraft of equivalent complexity and performance. It must not be assumed that pilots undertaking G280 type rating training have a working knowledge and understanding of systems such as FMS, EFIS selection and displays, Automated Flight Guidance and Control Systems, TAWS, TCAS, etc.



When agreed by ANAC, pilots with relevant knowledge and/or previous experience may benefit from credits towards a reduction of the ground school curriculum. For those pilots a “core” curriculum, consisting of a minimum of 58 hrs. classroom instruction, enhanced by an additional 10 hrs. System Integration Training in an approved Training Device is recommended.

For pilots with limited or no experience with any or all of the systems mentioned above, the GAA recommends additional modular training, as appropriate, before entering the G280 Ground School training phase.

The GAA further found that for training efficiency the following should be available:

- a consolidated Pilot Training Handbook to contain all relevant documentation required for training and self-study;
- part-task and desk top trainers to support the classroom lessons by hands-on practice;
- The instruction of complex systems should focus on the essential details required for the safe operation of the aircraft.

### 7.3 Flight Training in Aircraft

For type rating and checking, full use of a qualified and approved Full Flight Simulator is considered the standard. Flight training in aircraft is considered an exception and should only be permitted according to RBAC 61, 135 and RBHA 91.

#### 7.3.1 Prerequisites

Flight training in aircraft has its limitations with respect to the level and to the extent to which more complex emergency/abnormal situations can be practiced and checked. Therefore, the GAA recommends that flight training in aircraft:

- Should be limited to trainees with previous experience on an equivalent type or category of aircraft; and
- Should be followed by specific emergency procedures training in an FFS during recurrent type rating training within one year.

#### 7.3.2 G280 Type Rating training (flight training in aircraft)

Taking into account the prerequisite requirements in paragraphs 7.1 and 7.3.1 of this report, and based on the observations during the evaluation performed by EASA and registered in OEB report, the GAA recommends **a minimum of 6 training flights of 2 hours each**, followed by a Type Rating Skill Test.

## 7.4 Flight training in FFS

Use of a qualified and approved Full Flight Simulator is considered the standard for G280 flight training.

Flight Simulator training offers excellent opportunities to use both skill training, where a number of manoeuvres may be performed in a less time consuming sequence, as well as LOFT which is based on a realistic time-line.

It also allows a controlled, gradual increase in complexity of scenarios and the selection of a variety of conditions.

It is recommended the use of these features to their fullest extend to optimize training.

### 7.4.1 G280 Type Rating training (flight training in FFS)

Taking into account the considerations in paragraphs 7.1 and 7.3.1, and based on the observations during the evaluation performed by EASA and registered in OEB report, the GAA recommends **a minimum of 6 FFS training sessions of 4 hrs. each, operating as a crew**, followed by a Type Rating Skill Test

This is to be considered the minimum “core” course for suitably qualified and experienced pilots. For pilots without relevant experience, the GAA recommends additional modular simulator training as appropriate before starting the core course.

**Note:** Systems Integration Training, in addition to this minimum of 6 x 4 hrs (i.e. 24 hrs), is covered separately in paragraph 7.2 Theoretical Knowledge.

## 7.5 Flight Training Devices

By the time of this evaluation, there was only one G280 FFS level D in the world. A second one was up to be installed also in Dallas FSI facilities.

This tool should be used as the main tool for pilots’ trainings and checkings. It must be qualified and approved by ANAC.

## 7.6 Seat-dependent tasks training

The GAA identified the following seat dependent tasks for the G280 training:

- Passenger Oxygen System activation (right seat)
- Nose wheel steering through the tiller (left seat)

- Emergency Landing Gear Extension (ELG handle – right seat)

## 7.7 Training Area of Special Emphasis (TASE)

The following items should receive special emphasis as specified, during ground school and flight training in all referenced training courses:

- **Yaw Damper Failure or Inoperative** - due to lateral-directional characteristics of the airplane above 25,000 ft, 250 knots/0.70M with Yaw Dampers OFF, it is recommended that the operation with both Yaw Dampers OFF and related failures procedures are trained by the pilot during initial and recurrent training. It is also recommended that the pilot be aware of “DO NOT FLY INTO AREAS OF KNOWN SEVERE TURBULENCE WITH A FAILED YAW DAMPER.”
- **Weight and Balance and Performance Planning** – weight and balance and performance data are widely dispersed within the AFM. Emphasized instruction is needed to reinforce the location and application of tables, charts, and graphs, in determining weight and balance and aircraft performance.
- **Display Select Panel/Display Control Panel/Cursor Control Device operation and interaction** – Many of the menus, displays, and navigation functions are controlled through the DSP/DCP and Cursor Control Device. The various methods of accessing menus, i.e. selecting or configuring displays, inputting data, graphical flight planning, must be emphasized in training such that a crewmember is thoroughly familiar with their function and capabilities.
- **Flap setting verification at takeoff** – The Takeoff Warning System (TOWS) only warns the pilots of flap settings greater than 22° as power is applied on takeoff. There is no aural or visual warning if the flaps are set incorrectly less than or equal to 22°. CRM must emphasize that proper flap settings are selected and verified by both pilots based on calculated takeoff performance.
- **Flight Control Modes, Stall Warning and Stall Protection System** - It is important to thoroughly and completely understand the operation of the aircraft in each of the lateral and vertical flight control modes and, where applicable, thrust control modes.
- **Emergency descent procedure** - The G280 is capable to automatically start an Emergency Descent profile in the event of a loss of cabin pressure above 34,000 feet.

- **Thrust Compensation Module (TCM)** – Training will include engine failure on takeoff after V1 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 without over controlling.
- **Instrument Approaches** - The PlaneView280 avionics package (based on Rockwell Collins Proline Fusion) enables a wide array of instrument approaches to be flown, using both conventional ground-based and space-based aids to navigation (with or without augmentation). Approaches may be based on different kinds of lateral and vertical guidance, each with its own characteristics, minimums and displays and selections. For a safe operation, thorough understanding of each type of approach, its limitations and correct selection of Flight Modes is essential.
- **No-flap approach and landing** - In a situation where the flaps are failed in the 0° position, the approach and landing speeds are sufficiently close to other limiting speeds, such as tire limit speeds and landing gear operating speed, to warrant special emphasis of these limiting factors during training scenarios for this situation. As 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 proficiency check is recommended.

**IMPORTANT:** When the practical test is conducted in an airplane, versus a simulator, touchdown from a no flap approach is not recommended and shall not be attempted. The approach should 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.

- **Integrated standby Instrument/Display (ISI)** - The ISI display should be trained during normal and non-normal operations, both in manual selection and following automatic “pop up” display, including in startle scenarios and various phases of flight.
- **Auto Brakes** - Pilots must be thoroughly familiar with the Auto Brake system functionalities. Both for take-off (minimum balanced field length) and for landing (minimum required/actual landing field length), the performance data are based on the proper setting and use of the airplane’s brake system. It is especially important to emphasize that for landing distance calculations, full manual braking will give the shortest landing distance, while the 3 Auto Brake settings generate a fixed deceleration during the landing roll. With Auto Brakes selected, brake

application may vary as other deceleration factors (headwind, thrust reverse) vary.

- **Bank Angle** -The bank angle of the G280, specifically on take-off rotation and during touchdown has to be limited to avoid the wingtip making ground contact. This requires special attention during take-offs and landings in crosswind conditions, as well as during situations of asymmetric thrust.

## 7.8 Special Events Training

Special events training to improve basic crew understanding and confidence regarding aircraft handling qualities, options and procedures as these relate to design characteristics and limitations may include the following:

- recovery from unusual attitudes;
- manual flight with minimum use of automation, including flight under degraded levels of automation;
- handling qualities and procedures during recovery from an upset condition (e.g., wake vortex encounter, loss of control incident);
- high altitude high and low speed buffet margins and flight characteristics;
- Wind shear and predictive wind shear escape maneuvers, as applicable;
- Controlled Flight Into Terrain (CFIT), TCAS, EGPWS (emphasis on avoidance and escape maneuvers, altitude awareness, TCAS / EGPWS warnings, situational awareness and crew co-ordination, as appropriate).

## 7.9 Recurrent Training

Recurrent training must be compliant with the Brazilian regulations and include the Training Areas of Special Emphasis as identified in this report.

Recurrent training should incorporate special events training as described in this report on a rotational basis, performing all items every two years.

## 7.10 Specifications for Checking

Checking must be conducted in accordance with IS 00-002B or revision that comes to succeed it.

The GAA recommends the use of HPA ANAC checkride profile and that the following items should be included in the skill test and proficiency check schedules:

- GNSS approaches (LPV and/or LNAV/VNAV or LVAV/Baro); and
- a No-Flap or Non-Standard Flap Approach as described in the item 7.7.

### **7.11 Recent Experience**

The GAA found no specific recent experience requirements for G280 besides those from RBAC 61.

### **7.12 Currency**

The GAA found no specific currency requirements for G280 besides those from RBAC 61.

## 8 Line Flying Under Supervision (LIFUS) / Familiarization Flights

### 8.1 Purpose of LIFUS / Familiarization Flights

There are a variety of reasons why the GAA may recommend LIFUS / Familiarization Flights.

One or more of the reasons described below may apply:

- a. Introduction of new aircraft types or variants;
- b. Introduction of new systems (e.g., FMS, ECL, TCAS, HUD);
- c. Introduction of new operation (e.g. oceanic, polar or ETOPS operations);
- d. Experience for a particular crew position (e.g. PIC, SIC);
- e. Post qualification skill refinement (e.g. refining alternate or multiple ways to use particular equipment to increase operating efficiency, operating flexibility, or convenience); or
- f. Special characteristics (e.g. mountainous areas, unusual or adverse weather, special air traffic control procedures, non-standard runway surfaces and dimensions, etc.).

**NOTE: Nowadays, LIFUS is not foreseen in Brazilian regulations. However, the GAA found technically relevant that these items should be accomplished by the pilot after the regular training, as defined by EASA.**

### 8.2 LIFUS following G280 Type Rating Courses

In case of pilots completing the initial type rating for the G280, it is recommended that a minimum of **8 sectors LIFUS should be performed, followed by a 2 sector line check.**

Where there is a change of operating conditions or route structure, this should also be taken into account and may need the addition of sectors to cover these elements.

## 9 Compliance to RBHA 91 and RBAC 135

The GAA conducted a documental analysis of the Compliance Checklist with RBHA 91 and RBAC 135 provided by Gulfstream and it was considered satisfactory.

It does not constitute an approval and the compliance with the Brazilian operational regulations must be evaluated during the initial inspections preceding the aircraft registration with Brazilian marks.

The CCL is included in Appendix 2 of this report and can be used as a reference for operations approval.

Regarding the forward observer seat and item 135.75(b), please see item 3.2 of this report.



## **10 Technical Publications**

### **10.1 Master Minimum Equipment List - MMEL**

The FAA MMEL shall be used by Brazilian operators as a basis for developing their MEL. These documents are available at FAA website, through the link <http://fsims.faa.gov/PublicationForm.aspx>.

### **10.2 Airplane Flight Manual - AFM**

G280 AFM approved by GGCP/SAR shall be used by Brazilian operators as a basis for developing their Operator Airplane Operation Manual (AOM).

## APPENDIX 1 - Footprint Training

### GROUND TRAINING CURRICULUM SEGMENT

#### PROGRAMMED TRAINING HOURS

General Operational Subjects -----	6.0 hours
Aircrafts Systems -----	54.0 hours
Systems Integration -----	11.0 hours
<b>TOTAL-----</b>	<b>71.0 hours</b>

### FLIGHT TRAINING CURRICULUM SEGMENT

Flight Simulator as a Crew (Training Together)	PF (Hours)	PM (Hours)	Total Time (Hours)
Flight Simulator Module 1	2.0	2.0	4.0
Flight Simulator Module 2	2.0	2.0	4.0
Flight Simulator Module 3	2.0	2.0	4.0
Flight Simulator Module 4	2.0	2.0	4.0
Flight Simulator Module 5	2.0	2.0	4.0
Flight Simulator Module 6	2.0	2.0	4.0
Flight Simulator Module 7	2.0	2.0	4.0

Flight Simulator as a Crew (Training Alone – Second Pilot Provided)	PF (Hours)	PM (Hours)	Total Time (Hours)
Flight Simulator Module 1	2.0	0.0	2.0
Flight Simulator Module 2	2.0	0.0	2.0
Flight Simulator Module 3	2.0	2.0	4.0
Flight Simulator Module 4	2.0	0.0	2.0
Flight Simulator Module 5	2.0	0.0	2.0
Flight Simulator Module 6	2.0	0.0	2.0
Flight Simulator Module 7	2.0	0.0	2.0

## APPENDIX 2- Compliance Checklist

RBHA 91	Effective March, 2012		
ITEM	TITLE	COMPLIANCE	APPLICANT REMARKS
91.9 (b)	Flight Manual – Available on board	Operator's Responsibility	AFM is provided by Gulfstream
91.9 (c)	Aircraft identified in accordance with the standards RBHA 45	Operator's Responsibility	Gulfstream will paint to specifications
91.9 (d)	Takeoff or landing at a heliport constructed over water.	Not Applicable	
91.21	Portable electronic devices.	Operator's Responsibility	
91.107 (a)(3)	Seat or berth with a safety belt and shoulder belts.	Operator's Responsibility	Gulfstream installs seat belts in cabin as part of cabin STC
91.109 (a)	Dual Controls	Compliant	Standard equipment
91.171	VOR equipment check for IFR operations.	Operator's Responsibility	
91.189	Category II and III operations: General operating rules.	Compliant	G280 is certified for Category II operations
91.191	Category II and Category III manual.	Compliant	Category II Manual is part of basic AFM
91.193	Certificate of authorization for certain Category II operations	Operator's Responsibility	
91.203 (a)(2)	Flight manual and checklist;	Operator's Responsibility	
91.203 (d)	Certificate of Airworthiness for newly	Compliant	FAA CofA is on airplane when

	manufactured aircraft.		delivered to Dallas. ANAC CofA to be placed on airplane after ANAC validation
91.203 (f)	Operation with a fuel tank installed inside the passenger compartment.	Not Applicable	
91.203 (g)	No person may operate a civil airplane (domestic or foreign) into or out of an airport in Brazil unless it complies with the fuel venting and exhaust emissions requirements of RBAC 34.	Compliant	
91.205 (b)(1)	Airspeed indicator for each pilot required;	Compliant	Standard equipment
91.205 (b)(2)	Altimeter for each pilot required;	Compliant	Standard equipment
91.205 (b)(4)	A magnetic direction indicator (compass);	Compliant	Standard equipment
91.205 (b)(5)	Tachometer for each engine.	Compliant	Standard equipment
91.205 (b)(6)	Oil pressure gauge for each engine using pressure system.	Compliant	Standard equipment
91.205 (b)(7)	Temperature gauge for each liquid-cooled engine.	Not Applicable	
91.205 (b)(8)	Oil temperature gauge for each air-cooled engine.	Compliant	Standard equipment
91.205 (b)(9)	Torque gauge and gases temperature gauge for each engine and turbine	Compliant	Standard equipment - N1, N2 and ITT are provided

	as applicable;		
91.205 (b)(10)	Rotation rotor gauge for each main engine	Compliant	Standard equipment - N1, N2 and ITT are provided
91.205 (b)(11)	Manifold pressure gauge for each altitude engine.	Not Applicable	
91.205 (b)(12)	Fuel gauge indicating the quantity of fuel in each tank.	Compliant	Standard equipment
91.205 (b)(13)	Landing gear position indicator, if the aircraft has a retractable landing gear.	Compliant	Standard equipment
91.205 (b)(15)	Approved safety belt	Compliant	Gulfstream installs seat belts in cabin as part of cabin STC
91.205 (b)(16)	Approved shoulder belts on every front seat;	Compliant	Standard equipment
91.205 (b)(17)	An emergency location transmitter, if required by that regulation 91.207;	Compliant	Standard equipment
91.205 (b)(18)	Shoulder Harness	Compliant	Standard equipment
91.205 (b)(19)	For rotorcraft built after September 16, 1992, a shoulder belt for each seat;	Not Applicable	
91.205 (b)(20)	Fire extinguisher portable accessible to the members of the crew flight;	Compliant	Standard equipment
91.205 (b)(21)	For hydroplanes and amphibious aircraft, at least one anchor and one drogue.	Not Applicable	

91.205 (b)(22)	VHF, bilateral radio-communication	Compliant	Standard equipment
91.205 (b)(23)	Anti-collision lights	Compliant	Standard equipment
91.205 (c)(1)	Instruments and equipment specified in paragraph (b) of this section being all the instruments adequately illuminated	Compliant	Standard equipment
91.205 (c)(2)	a gyroscopic attitude indicator (artificial horizon);	Compliant	Standard equipment
91.205 (c)(3)	Approved position lights	Compliant	Standard equipment
91.205 (c)(4)	Approved anti-collision light	Compliant	Standard equipment
91.205 (c)(5)	Landing lights	Compliant	Standard equipment
91.205 (c)(6)	An adequate source of electrical energy for all installed electrical and radio equipment.	Compliant	Standard equipment
91.205 (c)(7)	One spare set of fuses, or three spare fuses of each kind required, that are accessible to the pilot in flight	Not Applicable	Circuit breakers used in lieu of fuses
91.205 (c)(9)	At least one equipment of radio navigational appropriate to each ground station to be used, when flying in controlled area;	Compliant	Standard equipment
91.205	Instruments and equipment specified in	Compliant	Standard equipment

(d)(1)	paragraph (b) of this section, and, for night flight, instruments and equipment specified in paragraph (c) of this section.		
91.205 (d)(2)	a VHF system of radio-communication bilateral and at least one equipment of navigation appropriate to the each ground station to be used, including phones (or loudspeakers) and microphones associates;	Compliant	Standard equipment
91.205 (d)(3)	Gyroscopic rate-of-turn indicator for each pilot required	Not Applicable	3rd attitude indicator installed in lieu of turn needle
91.205 (d)(4)	Slip-skid indicator for each required pilot	Compliant	Standard equipment
91.205 (d)(5)	Sensitive altimeter adjustable for barometric pressure for each pilot required;	Compliant	Standard equipment
91.205 (d)(6)	a heating system of "pitots" of the anemometric systems;	Compliant	Standard equipment
91.205 (d)(7)	a clock displaying hours, minutes and seconds, sweep second pointer or digital presentation for each pilot required	Compliant	Standard equipment
91.205 (d)(8)	Generator of adequate capacity.	Compliant	Standard equipment
91.205 (d)(9)	Gyroscopic pitch and bank indicator (artificial horizon) for each required	Compliant	Standard equipment

	pilot		
91.205 (d)(10)	Gyroscopic direction indicator (directional gyro or equivalent) for each required pilot	Compliant	Standard equipment
91.205 (d)(11)	a vertical speed indicator for each pilot required.	Compliant	Standard equipment
91.205 (e)	Flight at and above 24,000 ft. MSL (FL 240). DME	Compliant	Standard equipment
91.205 (f)	Category II operations. Required equipment and instruments	Compliant	Standard equipment
91.205 (g)	Category III operations. Required equipment and instruments	Not Applicable	
91.207 (a)(1)	There is attached to the airplane an approved automatic type emergency locator transmitter...	Compliant	Standard equipment
91.207 (a)(2)	For operations other than those specified in paragraph (a)(1) of this section, there must be attached to the airplane an approved personal type or an approved automatic type	Compliant	Standard equipment
91.207 (b)	Each emergency locator transmitter required by paragraph (a) of this section must be attached to the airplane in such a manner that the probability of damage to the transmitter in the	Compliant	Standard equipment



	event of crash impact is minimized. Fixed and deployable automatic type transmitters must be attached to the airplane as far aft as practicable.		
91.207 (f)	Paragraph (a) of this section does not apply to-	Title Only	
91.207 (h)	Each ELT on board of an aircraft registered in Brazil must meets the requirements of section 91.225 of this regulation.	Compliant	Standard equipment
91.207 (i)	From 01 of January of 2007 any new ELT to be installed in airplane registered in Brazil it must possess the frequencies of 121.5 and 406 MHz...	Compliant	Standard equipment
91.211 (b)	Pressurized cabin aircraft.	Compliant	Cockpit has oxygen and oxygen masks as standard equipment. Passenger oxygen system installed as part of cabin STC
91.213 (a)	List of minimum equipment and instruments for operation.	Operator's Responsibility	FAA approved MMEL is provided
91.215	ATC transponder and altitude reporting equipment and use.	Compliant	Standard equipment
91.217 (b)	The equipment was tested and calibrated to transmit altitude data corresponding within 125	Operator's Responsibility	

	feet of the indicated or calibrated datum of the altimeter normally used to maintain flight altitude,		
91.217 (c)	Unless the altimeters and digitizers in that equipment meet the standards of TSO-C10b and TSO-C88, respectively.	Compliant	Standard equipment
91.219	Altitude alerting system or device: Turbojet-powered civil airplanes.	Compliant	Standard equipment
91.221 (a)	All airspace: Brazil-registered civil aircraft. Any traffic alert and collision avoidance system installed in a Brazil - registered civil aircraft must be approved by the Administrator.	Compliant	Standard equipment
91.221 (c)	(Airspace RVSM (Reduced Vertical Separation Minimum). Notwithstanding the provide one in paragraph (b) of this section, when operating an aircraft in airspace RVSM, no person can shall have ACAS system on and operating unless this system is of type ACAS II (TCAS II, type 7.0).	Compliant	Standard equipment - Type 7.1 installed
91.221 (d)	Aircraft transport category configured with more than 30 seats, that they have received its first one Airworthiness	Not Applicable	

	Certified (independent of the issuer country) in or after 01 of January of 2008, must be equipped with a system ACAS II (TCAS II, type 7.0 or superior).		
91.221 (e)	Aircraft transport category configured with more than 30 seats, that they have received its first one Airworthiness Certified (independent of the issuer country) in or after 01 of January of 2010, must be equipped with a system ACAS II (TCAS II, type 7.0 or superior).	Not Applicable	
91.223	Terrain awareness and warning system. (EGPWS)	Compliant	Standard equipment
91.223 (a)	Airplanes manufactured after December 31, 2003....	Compliant	Standard equipment
91.223 (b)	Airplanes manufactured on or before January 01, 2004....	Not Applicable	
91.223 (c)	Airplane Flight Manual. The Airplane Flight Manual shall contain appropriate procedures	Compliant	
91.225	All the electronic equipment on board required by this regulation and the RBHA 121 and 135 that they receive and/or they transmit radio signals	Compliant	Standard equipment

	of/to control systems stations of air traffic, meteorology and searches and rescue must comply with norms and specifications established by Department of Control of Airspace (Departamento de Controle do Espaço Aéreo – DECEA).		
91.409 (a)	Inspections.	Title Only	
91.409 (a)(1)	Annual Maintenance Inspection (AMI) in accordance with RBHA 43.	Operator's Responsibility	
91.409 (a)(2)	Initial survey to obtain an airworthiness certificate in accordance with RBHA 21	Operator's Responsibility	
91.409 (b)	100 hrs Inspection	Operator's Responsibility	
91.409 (c)	Paragraphs (a) and (b) of this section shall not apply to	Operator's Responsibility	
91.409 (d)	Progressive inspection.	Operator's Responsibility	
91.409 (e)	Large airplanes (to which part 125 is not applicable), turbojet multiengine airplanes, turbo-propeller-powered multiengine airplanes, and turbine-powered rotorcraft.	Operator's Responsibility	
91.409 (f)	Selection of inspection program under paragraph	Operator's Responsibility	

	(e) of this section.		
91.409 (f)(1)	An inspection program for continued airworthiness...	Operator's Responsibility	
91.409 (f)(2)	A program of inspections.	Operator's Responsibility	
91.409 (f)(3)	A current inspection program recommended by the manufacturer.	Operator's Responsibility	Gulfstream provides MSG-3 compliant maintenance program
91.409 (f)(4)	Any other inspection program approved by DAC	Operator's Responsibility	
91.409 (g)	Inspection program approved under paragraph (e) of this section.	Operator's Responsibility	
91.409 (h)	Change an inspection program to another.	Operator's Responsibility	
91.410 (a)	Limitation on number of cycle / aircraft.	Not Applicable	
91.410 (b)	Instructions for maintenance and inspection of fuel tank system.	Not Applicable	
91.411 (a)	Testing and inspection static pressure system according to RBHA 43 appendix E.	Operator's Responsibility	
91.411 (b)	The tests required by paragraph (a) of this section must be conducted by the manufacturer	Operator's Responsibility	Airplane is delivered new compliant with 91.411(b)
91.413 (a)(2)	Use an ATC transponder	Operator's Responsibility	

91.413 (b)(3)	The tests and inspections specified in this section must be conducted by—the manufacturer of the aircraft	Operator's Responsibility	
91.503	Flying equipment and operating information	Operator's Responsibility	AFM provides required performance information and all required checklists
91.505	Familiarization with operational limitations and emergency equipments	Operator's Responsibility	
91.507	Equipment requirements: night VFR operations	Operator's Responsibility	Airplane is delivered compliant with the requirements
91.509	Survival equipment for overwater operations	Operator's Responsibility	Airplane is delivered compliant with the requirements
91.511	Radio communication equipment appropriate to the facilities	Operator's Responsibility	Airplane is delivered compliant with the requirements
91.513	Emergency equipment	Operator's Responsibility	Airplane is delivered compliant with the requirements
91.517 (a)	Passenger Information	Operator's Responsibility	Airplane is delivered compliant with the requirements
91.517 (b)(c)(d)(e) )	Passenger Information	Operator's Responsibility	
91.519	Oral Instructions to Passengers	Operator's Responsibility	
91.521	Shoulder harness	Compliant	

91.523	Hand Luggage	Not Applicable	
91.525	Carriage of cargo	Operator's Responsibility	
91.527	Operating in icing conditions	Operator's Responsibility	
91.533	Flight attendant requirements	Not Applicable	
91.537	RVSM	Operator's Responsibility	
91.603	Aural speed warning device	Operator's Responsibility	Airplane is delivered compliant with the requirements
91.605	Transport category civil airplane weight limitations	Operator's Responsibility	AFM provides all required performance
91.607	Emergency exits for airplanes carrying passengers for hire	Operator's Responsibility	Airplane is delivered compliant with the requirements
91.609	Flight data recorders and cockpit voice recorders	Operator's Responsibility	

<b>RBAC 135</b>			
<b>ITEM</b>	<b>TITLE</b>	<b>COMPLIANCE</b>	<b>APPLICANT REMARKS</b>
135.75 (b)	Observer seat in the compartment of the pilots	Compliant	Jump Seat installation available via STC during final phase
135.83 (a)(2)	Emergency cockpit checklist	Operator's Responsibility	Checklists are available in AFM/QRH
135.83 (a)(5)	Performance data on one engine inoperative climb	Operator's Responsibility	Performance data available in AFM/OPM

135.83 (c)	Contents checklist of emergency:	Operator's Responsibility	Checklists are available in AFM/QRH
135.87 (a)	Carried in an approved cargo rack, bin, or compartment	Operator's Responsibility	Class B cargo compartment aft of secondary pressure bulkhead
135.87 (b)	Secured by an approved means	Operator's Responsibility	Class B cargo compartment aft of secondary pressure bulkhead
135.87 (d)	Means to prevent articles of baggage stowed under it from sliding under crash impacts	Operator's Responsibility	Class B cargo compartment aft of secondary pressure bulkhead
135.87 (e)	Cargo compartments requiring physical entry of a crew member.	Operator's Responsibility	Class B cargo compartment aft of secondary pressure bulkhead. AFM has appropriate procedures for fighting a fire.
135.89 (a)	Unpressurized aircraft.	Operator's Responsibility	Airplane may be operated unpressurized
135.89 (b)	Pressurized aircraft	Operator's Responsibility	Airplane is equipped with crew and passenger oxygen system when delivered completed to the operator
135.93	Autopilot: Minimum altitudes for use.	Operator's Responsibility	Limitations stated in the AFM
135.111	Second in command required in category II operations	Operator's Responsibility	Minimum crew is pilot and copilot
135.113	Passenger occupancy of pilot	Operator's Responsibility	Minimum crew is pilot and copilot



	seat		
135.127(a)	The operator shall not permit anyone or flight crew member to smoke in an aircraft operated under this RBAC.	Operator's Responsibility	
135.127(b)	No smoking Illuminated sign or placard	Operator's Responsibility	
135.127(c)	Lavatory	Operator's Responsibility	
135.127(d)	Obstruct, shut down or destroy a smoke detector installed in the lavatory.	Operator's Responsibility	
135.128(a)	Approved seat or bed, with individual seat belts.	Operator's Responsibility	
135.129	Exit seating	Operator's Responsibility	
135.143(c)	ATC transponder equipment	Compliant	Standard equipment
135.145	Flights Operational Evaluation	Operator's Responsibility	
135.147	Dual controls required.	Compliant	Standard equipment
135.149(a)	Sensitive altimeter	Compliant	Standard equipment
135.149(b)	Heating or deicing equipment for each carburetor	Not Applicable	
135.149(c)	Artificial horizon - the third indicator	Compliant	Standard equipment

135.150	Public address and crewmember interphone systems.	Not Applicable	
135.151	Cockpit voice recorders.	Compliant	Standard equipment
135.152	Flight recorders.	Optionally compliant	Dedicated FDR installed by STC during final phase
135.152a	Recorder Digital Flight Data for Aircraft with 10-19 seats.	Optionally compliant	Dedicated FDR installed by STC during final phase
135.153	Ground proximity warning system.	Compliant	Standard equipment
135.154(a)(1)	Airplanes with turbine engines with 10 or more seats for passengers	Compliant	Class A TAWS is Standard Equipment
135.154(a)(2)	Airplanes with turbine engines with 6-9 passenger seats	Compliant	Class A TAWS is Standard Equipment
135.154(b)	Airplane manufactured on or before January 1, 2004	Not Applicable	G280 was first manufactured after 2004
135.154(c)	Airplane Flight Manual.	Compliant	
135.155	Fire extinguishers: Passenger-carrying aircraft.	Compliant	Appropriate fire extinguishers are installed during completion process.
135.157(a)	Unpressurized aircraft.	Compliant	Crew oxygen is standard equipment. Cabin oxygen system is installed during the

			completion process.
135.157(b)	Pressurized aircraft.	Compliant	Crew oxygen is standard equipment. Cabin oxygen system is installed during the completion process.
135.158	Pitot heat indication systems.	Compliant	Standard equipment
135.159(a)	A gyroscopic rate-of-turn indicator	Compliant	Standard equipment
135.159 (b)	A slip skid indicator	Compliant	Standard equipment
135.159 (c)	A gyroscopic bank-and-pitch indicator.	Compliant	Standard equipment
135.159 (d)	A gyroscopic direction indicator.	Compliant	Standard equipment
135.159 (e)	A generator or generators able to supply all probable combinations of continuous in-flight electrical loads for required equipment and for recharging the battery	Compliant	Standard equipment
135.159 (f)(1)	An anti-collision light system;	Compliant	Standard equipment
135.159 (f)(2)	Instrument lights	Compliant	Standard equipment
135.159(g)	Continuous electrical load in flight	Compliant	Standard equipment
135.161(a)	Radio equipment for bilateral communications	Compliant	Standard equipment

135.161(b)	Radio navigation equipment	Compliant	Standard equipment
135.163(a)	Required a vertical speed indicator for each pilot.	Compliant	Standard equipment
135.163(b)	A free-air temperature indicator;	Compliant	Standard equipment
135.163(c)	A heated pitot tube for each airspeed indicator;	Compliant	Standard equipment
135.163(d)	A power failure warning device	Compliant	Standard equipment
135.163(e)	An alternate source of static pressure	Compliant	Standard equipment
135.163(f)	For a single-engine aircraft:	Not Applicable	
135.163(g)	For multi-engine aircraft, at least two generators or alternators each of which is on a separate engine	Compliant	Standard equipment
135.163(h)	Two independent sources of energy for gyroscopic instruments	Compliant	Standard equipment
135.165(a)	The reaction plane with 10 or more passenger seats, or engine airplane in an additional operation.	Not Applicable	
135.165(b)(1)	A transmitter;	Compliant	Standard equipment
135.165(b)(2)	Two microphones;	Compliant	Standard equipment

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135.165(b)(3) )	Two headphones or an earpiece and speaker;	Operator's Responsibility	Airplane is delivered with 2 headsets and 2 speakers
135.165(b)(4) )	A marker beacon receiver	Compliant	Standard equipment
135.165(b)(5) )	Two independent receivers for navigation;	Compliant	Standard equipment
135.165(b)(6) )	Two independent receivers for communications, and	Compliant	Standard equipment
135.165(b)(7) )	An additional transmitter.	Compliant	Standard equipment
135.165(b)(8) )	Helicopters in offshore operations, if required, a marine VHF.	Not Applicable	
135.167(b)	Liferafts	Compliant	Required safety equipment is installed as part of the cabin STC.
135.167(c)	Emergency locator transmitter fixed to one of the boats.	Operator's Responsibility	
135.167(d)	Helicopters operating in fixed or floating platforms.	Not Applicable	
135.169(a)	Operation of a large airplane.	Operator's Responsibility	
135.169(b)	Operation of a small plane with a conventional engine or turboprop, with 10	Not Applicable	

	passenger seats or more.		
135.169(c)	Small plane with a passenger configuration of 10 seats or more.	Not Applicable	
135.169(d)	Cargo or baggage compartments:	Operator's Responsibility	
135.169(e)	Reports of conversions and reconfigurations (retrofit.)	Operator's Responsibility	
135.170	Materials for compartment interiors.	Compliant	Material installed per cabin STC meets requirements.
135.171(a)	The reaction plane or having 10 passenger seats or more	Compliant	Standard equipment
135.173	Airborne thunderstorm detection equipment requirements.	Compliant	Standard equipment
135.175	Airborne weather radar equipment requirements.	Compliant	Standard equipment
135.177	First Aid Kit	Not Applicable	
135.178(a) to (f)	Additional emergency equipment.	Not Applicable	
135.178(g)	Exterior exit markings. Each passenger emergency exit and the means of opening that exit	Compliant	Paint applied during the completion process is compliant

	<p>from the outside must be marked on the outside of the airplane. There must be a 5 cm(2-inch) colored band outlining each passenger emergency exit on the side of the fuselage. Each outside marking, including the band, must be readily distinguishable from the surrounding fuselage area by contrast in color. The markings must comply with the following:</p>		
135.178(g)(1)	<p>If the reflectance of the darker color is 15 percent or less, the reflectance of the lighter color must be at least 45 percent.</p>	Compliant	Paint applied during the completion process is compliant
135.178(g)(2)	<p>If the reflectance of the darker color is greater than 15 percent, at least a 30 percent difference between its reflectance and the reflectance of the lighter color must be provided.</p>	Compliant	Paint applied during the completion process is compliant

135.178(g)(3) )	Exits that are not in the side of the fuselage must have the external means of opening and applicable instructions marked conspicuously in red or, if red is inconspicuous against the background color, in bright chrome yellow. Additionally, when the opening means for such an exit is located on only one side of the fuselage, a conspicuous marking to that effect must be provided on the other side. “Reflectance” is the ratio of the luminous flux reflected by a body to the luminous flux it receives.	Not Applicable	
135.180	Traffic Alert and Collision Avoidance System.	Compliant	Standard equipment
135.183(a)	Operating at an altitude required to achieve land in case of engine failure;	Operator's Responsibility	AFM provides all required data for compliance
135.183(c)	Multi-engined aircraft - maximum weight	Operator's Responsibility	AFM provides all required data for compliance



135.183(d)	Helicopter equipped with flotation device	Not Applicable	
135.361 to 135.399	Applicability	Operator's Responsibility	AFM provides all required data for compliance
135.421(a)	Type certificated aircraft with a configuration of 9 seats for passengers or less	Operator's Responsibility	Gulfstream provides MSG-3 compliant maintenance program
135.421(b)	Manufacturer's maintenance program		Gulfstream provides MSG-3 compliant maintenance program
135.421(c)	Single-engine airplane used in operations under IFR passenger transport	Not Applicable	
135.421(d)	Single-engine airplane used in operations under IFR, carrying passengers...	Not Applicable	
135.421(e)	Single-engine airplane carrying passengers in IFR conditions	Not Applicable	