

Gulfstream
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Operational Suitability Data (OSD) Flight Crew

Gulfstream IV Series

19 May 2015

Gulfstream IV

Operational Suitability Data (OSD) – Flight Crew

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Revision Record

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Acronyms

AC	Advisory Circular
AEG	FAA Aircraft Evaluation Group
AFCS	Automatic Flight Control System
AFM	Aircraft Flight Manual
AMC	Acceptable Means of Compliance
AP	Autopilot
APR	Automatic Performance Reserve
AT	Auto Throttle
CBT	Computer Based Training
CPD	Common Procedures Document for conducting Operational Evaluation Boards, dated 10 June 2004
CRM	Crew Resource Management
CS-FCD	Certification Specifications for Operational Suitability Data (OSD) Flight Crew Data CS-FCD, Initial issue, 31 January 2014
CS-FSTD(A)	Certification Specifications for Aeroplane Flight Simulation Training Devices of 4 July 2012
Difference Level	A designated level of difference as defined in CS-FCD
DU	Display Unit
EASA	European Aviation Safety Agency
EFB	Electronic Flight Bag
EFIS	Electronic Flight Instrument System
EGPWS.....	Enhanced Ground Proximity Warning System
EICAS	Engine Indicating and Crew Alerting System
EU-OPS	Commission Regulation (EC) No 859/2008 of 20 August 2008 amending Council Regulation (EEC) No 3922/91 as regards common technical requirements and administrative procedures applicable to commercial transportation by aeroplane.
EVS.....	Enhanced Vision System
FAA	Federal Aviation Administration
FADEC	Full Authority Digital Engine Control
FAR.....	Federal Aviation Regulation
FCP	Flight Control Panel
FCS.....	Flight Control System
FFS	Full Flight Simulator (Level C/D)
FMA	Flight Mode Annunciator
FMS	Flight Management System
FPA.....	Flight Path Angle
FPV	Flight Path Vector

FSB	Flight Standardization Board
FTD	Flight Training Device
GALP	Gulfstream Aerospace Limited Partnership
GM	Guidance Material
IAI	Israel Aerospace Industries
JAA	Joint Aviation Authorities
JAR	Joint Aviation Requirements
JOEB	Joint Operational Evaluation Board
LIFUS.....	Line Flying Under Supervision
LPC	Part-FCL Licence Proficiency Check
LOFT	Line Orientated Flying Training
LST	Licence Skill Test
MCDU	Multifunction Control Display Unit
MDR.....	Master Difference Requirements
MEL.....	Minimum Equipment List
MFD	Multi-Function Display
MMEL.....	Master Minimum Equipment List
MMO	Maximum Operating Mach Number
NAA.....	National Aviation Authority
OEB	Operational Evaluation Board
ODR	Operator Differences Requirements
OPC	Operator Proficiency Check
OSD	Operational Suitability Data
Part-FCL	Flight Crew Licensing: Annex I to Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (as amended)
Part-ORO	Organisation Requirements for Air Operations: Annex III to Commission Regulation (EU) No 965/2012 of 05 Oct 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (as amended)
Part-SPA	Specific Approvals: Annex V to Commission Regulation (EU) No 965/2012 of 05 Oct 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (as amended)
PF	Pilot Flying
PFD	Primary Flight Display
PIC	Pilot In Command
PM.....	Pilot Monitoring

PTM	Pilot Training Manual
QRH	Quick Reference Handbook
Route Sector	as defined in Part-FCL ["Route sector" means a flight comprising take-off, departure, cruise of not less than 15 minutes, arrival, approach and landing phases]
SIC	Second In Command
TASE	Training Areas of Special Emphasis
TAWS.....	Terrain Awareness and Warning System
TCAS	Traffic Alert and Collision Avoidance System
V2	Take-off Safety Speed
VNAV	Vertical Navigation

Preamble

1. Introduction

Where references are made to requirements and where extracts of reference texts are provided, these are at the amendment state at the date of evaluation or publication of this document. Users should take account of subsequent amendments to any references, in particular concerning requirement for civil aviation aircrew and air operations.

Determinations made in this document are based on the evaluations of specific configurations of aircraft models, equipped in a given configuration and in accordance with current regulations and guidance.

Modifications and upgrades to the aircraft evaluated require additional OSD assessment for type designation, training / checking / currency, operational credits, and other elements within the scope of the OSD evaluations.

In accordance with Commission Regulation (EU) No 69/2014 of 27 Jan 2014, the Operational Suitability Data contained in this document are identified as follows:

[M].....mandatory Operational Suitability Data, bearing the status of rule (see GM No 3 to 21A.15(d))

[AMC]non-mandatory Operational Suitability Data, bearing the status of Acceptable Means of Compliance (see GM No 3 to 21A.15(d))

2. Operational Evaluation Gulfstream IV

A “catch-up” evaluation of the Gulfstream IV was completed in June 2004 by an integrated team of operational experts of JAA members.

The JAA conducted an operational evaluation process involving a review of aircraft flight manual (AFM) and associated supplements, MMEL requirements, training courses and aircraft operating manuals (AOM). Aircraft systems were reviewed and Normal, Abnormal, and Emergency procedures evaluated for the Gulfstream IV series.

JAR references, as JAR-OPS 1 (§ 1.940, 1.945, 1.950, 1.965, 1.970 and 1.980 including associated appendices, AMCs, IEMs and ACJs), JAR-FCL 1 (§1.215, 1.220, 1.225, 1.230 1.235, and 1.261 including associated appendices, AMCs and IEMs) requirements, have been considered.

The JOEB operational evaluation was conducted in compliance with the JAA Terms of References for JOEBs and the JOEB Handbook, dated December 2002.

3. Operational Evaluation – Group Composition

Name	Organization	Function
Evan NIELSEN	CJAA	JOEB Co-ordinator
Jean BARIL	CJAA	JOEB Co-ordinator
Jamie SHAWYER	JAA	JOEB advisor
Terry NEALE	CAA UK	JOEB Chairman

Operational Suitability Data (OSD) – Flight Crew**1. Aircraft Type Designation and Pilot License Endorsement [M]**

With reference to Part-FCL, FCL.010 ('type of aircraft') and GM1 FCL.700, the Gulfstream IV aircraft has been evaluated for aircraft categorisation and license endorsement.

The license endorsement is established as "GIV".

Manufacturer	Aircraft Model / Name	License Endorsement	Variants	Complex	SP / SP HPA / MP	OEB FC REPORT / OSD FC available	Remarks
Gulfstream Aerospace Corporation	Gulfstream GIV Gulfstream GIV SP (G300/G400)	GIV	—	X	MP	X	OSD FC GIV, dated 19 May 2015

2. Aircraft Specifics**2.1 Overview**

Serial numbers 1001 through 1213 are designated as Gulfstream IV, however, serial number 1214 and subsequent are designated as Gulfstream IV -SP; the difference being an increase in both maximum take-off and landing mass. More recently, the manufacturer's designation for the Gulfstream IV-SP has been changed to the G400 and the G300. The G300 is a shorter-range version of the G400. Throughout this report references to the Gulfstream IV series are applicable to the Gulfstream IV-SP, the G300 and the G400. The HUD and EVS are fitted as standard on the G400 model.

2.2 Aircraft Approach Category [M]

With reference to Part-CAT, CAT.OP.MPA.320(b) the approach category for the GULFSTREAM IV is as follows:

Aircraft	Category
Gulfstream GIV	D

The approach category can be higher dependent on the operation. The determination should be made by the operator based on approach speed calculations in accordance with applicable regulations.

2.3 Memory items

[AMC] Emergency procedures are an essential part of the training curriculum. To avoid confusion during training, as well as during actual operations, Training Organizations and pilots need to be

made aware of the steps to be performed without immediate reference to the checklist. These steps should be defined before training is started, preferably by the operator as part of its Standard Operating Procedures.

[M] Pilots must be able to respond to such events as hot start, engine failure on take-off, engine fire, thrust reverser unlocked and emergency descent with initial actions without immediate reference to the checklist.

[AMC] Operators should develop their own memory items in accordance with their operating philosophy.

2.4 Head-Up Display – HUD

The Head-up Display System installed on the Gulfstream IV series has been evaluated and was found to be acceptable.

2.5 Enhanced Vision System – EVS

The EVS installed on the Gulfstream IV series has been evaluated and was found to be acceptable.

2.6 All Weather Operations

Low Visibility Take-Offs or approach capabilities below ILS CAT I were not evaluated.

2.7 Part-CAT, Subpart D – Instruments, Data, Equipment

EU operators must show compliance with applicable elements of Annex IV to EU Regulation 956/2012 (Part-CAT, Subpart D), prior to beginning commercial transport operations.

The Gulfstream IV was not evaluated against compliance with EU-OPS Subparts K and L.

3. Operator Differences Requirements (ODR)

No evaluation of credits for commonality or variant determinations between the GULFSTREAM IV and any other models were performed. Consequently, ODR's do not apply.

4. Master Differences Requirements (MDR)

No evaluation of credits for commonality or variant determinations between the GULFSTREAM IV and any other models were performed. Consequently, MDR's do not apply.

5. Specifications for Training

5.1 Gulfstream IV Initial Type Rating Training

Initial type rating training was evaluated and found compliant with JAR-FCL-AMC 1.261 (c) (2).

5.1.1 Prerequisites

[AMC] Prior experience in multi-engine transport turbojet aircraft and prior knowledge on EFIS, FMS operation and integrated avionics is recommended for initial training on the Gulfstream IV.

[M] Pilots entering the Gulfstream IV type rating training course must hold an ATPL, or a PPL/CPL with Multi-Engine / Instrument Rating and theoretical knowledge at ATPL level. Have completed 70 hrs as Pilot In Command and a Multi Crew Coordination (MCC) course.

5.1.2 Gulfstream IV Training

[AMC] Early exposure to the AFGS, FMA and FMS is important, especially for pilots with no previous 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 Automatic Flight Control System (AFCS). In the event of a flight path deviation due to input error or system malfunction, the flight crew must be able to comfortably transition from automatic to manual mode and back in an orderly fashion.

[AMC] The safe operation of the airplane is predicated upon the awareness, at all times and of both pilots, of the airplane's Flight Modes and flight parameters. Strict adherence to Crew Coordination Procedures (CCP's) is essential and should be regarded as mandatory. These CCP's should be fully integrated in the training. Training Organizations should be made aware of the Crew Coordination Procedures as established by the operator, before training is started. Pilots having no relevant experience with the application of Crew Coordination Procedures will benefit from a bridge-course on this topic.

[AMC] Engine "spool-up" time is longer than most transport category jet aircraft. At low altitude e.g. during circling, the spool-up time will be significantly increased if Flaps are < 22°. Training should emphasise these points. A thorough pre-flight briefing, highlighting engine spool-up times should be accomplished prior to conducting training or checking in the following areas: stalls, touch-and-go landings, simulated one-engine inoperative manoeuvres and reduced flap approach and landing.

[AMC] The Gulfstream IV series is equipped with four elliptical emergency exits, which are unique to Gulfstream. Appropriate evacuation technique and current passenger size, especially when a life jacket is worn must be considered and trained. Operators should ensure that any life rafts carried can be deployed through these exits.

[AMC] Appendix 1 shows the footprint of the evaluated training.

5.1.3 Training Areas of Special Emphasis (TASE)

[M] The following items must receive special emphasis as specified:

- Enhanced GPWS
- Flight Management System (FMS)
- Airborne Collision and Avoidance System (ACAS)
- Limitations i.e. mass, flap speeds and tire limits
- Head-Up Display System (HUD) (optional)
- Enhanced Vision System (EVS) (optional)
- Relatively high approach speeds (category D), especially when circling
- Aileron deflection required under limiting engine out conditions
- Flight Power Shut-Off system
- Engine “spool-up” times

[AMC] Operators may add additional elements as required by their operation, and these will vary. Training organisations should review their training courses when applicable aircraft modifications occur. Training organisations may add additional elements as required by the operator.

5.2 Recurrent Training

Recurrent training must be compliant with EU regulations for civil aviation aircrew and air operations, as applicable, and include the identified Training Areas of Special Emphasis.

6. Line Flying Under Supervision (LIFUS) / Supervised Operating Experience (SOE)

LIFUS should be performed in accordance with ORO.FC.220 and AMC1 ORO.FC.220(e). Furthermore, GM1 ORO.FC.220(d) provides guidelines for operators to use when establishing their individual requirements. Supervised Operating Experience (SOE) may be established in accordance with Part-FCL, FCL.720.A (g) through the operational suitability evaluation.

[AMC] A minimum of 10 route sectors (5 as PF, 5 as PM), plus a line check should be performed following Gulfstream IV initial type rating training.

[AMC] Where there is a change of operating conditions or route structure, this should be taken into account and may need additional route sectors to cover these elements.

7. Specifications for Recent Experience and Currency

Recent experience requirements are contained in Part-FCL, FCL.060.

Appendix 1

[AMC] GULFSTREAM IV Initial Type Rating Training

The following curriculum is considered to be the minimum for the initial type rating training for the Gulfstream IV:

System Integration Training, consisting of:

- Automated Flight Guidance System (AFGS)
- Primary Flight Display mode annunciations
- Flight Management System (FMS)
- Display Controllers (DC)
- Head-Up Display System (HUD) (optional)
- Enhanced Vision System (EVS) (optional)

Flight Training (FFS – Level C or D and/or aircraft), consisting of:

- Dual hydraulic system malfunctions
- ILS approach on standby instruments
- Primary Flight Display (PFD), Navigation Display (ND), EICAS reversionary modes
- Integrated use of EICAS messages, switch positions and system synoptic pages to determine aircraft system status
- Use of the autopilot for completion of the emergency descent manoeuvre
- Engine response to full power applications at various altitudes (especially high altitude stalls and touch and go landings during simulated one-engine inoperative training/checking)
- Head-Up Display System (HUD) (optional)
- Enhanced Vision System (EVS) (optional)

Aircraft training (landings):

- as required by regulations