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Gulfstream Flight Operations Standard Operating Procedures (November 2009)

(31 pages)

Gulfstream

A GENERAL DYNAMICS COMPANY

Flight Operations Test

Standard Operating Procedures

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REVISIONS

Gulfstream Aerospace Corporation SOP Manual revisions will be sent to all manual holders.

Revisions will be numbered in order followed by the year of the revision; i.e. 1-05 would be the first revision of 2005. Each revised page will carry the revision date.

Revision marks will be placed on the left side margin of the revised page to show material that has been added.

Revision Number	Date	Revised By	Revision Number	Date	Revised By
NEW	10/18/05	Gulfstream			
1-07	6/01/07				
2-08	11/01/08				
3-09	11/01/09				

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CHAPTER 1

INTRODUCTION

This section provides guidance and requirements for test pilots during the conduct of experimental, production, completion, and maintenance (i.e., those flights conducted in support of any service center) test flights. Cooperation with the Gulfstream Aerospace Corporation Flight Test department is necessary for compliance with the experimental, development, and engineering flight test requirements.

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CHAPTER 2

SAFETY

2.1.0. Philosophy

The Vice President of Flight Operations and Chief Test Pilot stress the absolute importance of incorporating safety into all operations. The preventative, proactive posture that has been adopted is designed to identify associated risks and then mitigate those risks as much as possible. This safety program has been constructed to allow integration within daily flight operations with the overall objective of accomplishing the test efforts in the most efficient and effective manner.

2.2.0. Risk Management

The FAA Order 4040.26A will be used as the primary guidance for risk management. The flight maneuvers are categorized with respect to a risk level and are presented below. The overall flight risk level will correspond to the highest individual maneuver risk level. Pilot assignment will be with respect to the flight risk level. Pilots are categorized such that their classification matches risk level categories. The Chief Test Pilot approves the pilot classification list. The list classifies a pilot within a certain category with added or deleted maneuvers by exception. The pilot-in-command must be authorized for the risk level assigned to the flight or the specific maneuvers to be performed.

For experimental, developmental, and engineering test flights, GAC Flight Test will generate a test plan. The project test pilot will review the test plan and make appropriate comments. If the project test pilot is unavailable, the Chief Test Pilot will assign a substitute. The test plan will include risk level categories for each maneuver. If a test plan includes maneuvers identified as Medium- or High-risk, a Safety Review Board (SRB) will convene. The objective of the SRB is to identify the risks associated with each maneuver and then to derive risk-mitigating factors to be implemented during testing. These items are documented on a Test Safety Hazard Analysis form. The SRB members are experienced flight test personnel from GAC Engineering, Flight Test, and Flight Operations Departments. VP Flight Operations and the Chief Test Pilot are the SRB members from Flight Operations. It is imperative that the project test pilot also attends the SRB. If the SRB is being convened for a

certification test program, the participating FAA crewmembers will be invited to attend.

When preparing for a test flight, the FTE will determine which maneuvers will be performed, reference the maneuver risk level assessment, and forward the flight risk level and a list of the maneuvers in the highest risk category to the Flight Test Coordinator. The Flight Test Coordinator will then ensure that the Flight Scheduler receives that information via the flight request. Test flights classified as Medium- or High-risk will be piloted by GAC pilots only. Only the minimum personnel required for the conduct of the test flight are authorized for all test flights. Recognizing the necessity for individual training, additional personnel may be authorized by the appropriate supervisor.

Flights conducted with personnel from the FAA, Atlanta Aircraft Certification Office will conform to the requirements of the Memorandum of Understanding for FAA/GAC Flight Test Safety and Risk Assessment (included as Appendix 1).

2.3.0. Maneuver Risk Assessment by Maneuvers

A. Category A – Low Risk

- Production, completion, and flights performed for any GAC or GDAS service center (stalls, maximum anti-skid braking, maximum thrust reverser usage, EGPWS checks and abnormal flight control configurations, such as pitch and roll disconnects, routinely performed during these flights are categorized as Low Risk)
- Level flight, climb, and descent performance
- Pitot-static
- STC follow-on
- Avionics

B. Category B – Medium Risk

- Braking performance
- Low-altitude operations (EGPWS)
- TCAS intruder
- Field performance
- CTOs (except at maximum TOGW)
- Handling qualities
- Stall characteristics/performance

- Single-engine takeoffs / landings
- Icing
- Engine quick-relights
- Flight control law development (may be considered high risk depending on level of development, criticality of potential response, and phase of flight)
- Abnormal flight control configuration (e.g., manual reversion in any axis)
- Smoke evacuation
- Asymmetric thrust reverser deployments
- FADEC development
- Intentional <1g Nz
- Formation

C. Category C – High Risk

- Minimum control airspeed, Air (Vmca, Vmcl)
- Minimum control airspeed, Ground (Vmcg)
- Minimum unstick speed (Vmu)
- Flutter
- Maximum kinetic energy braking
- Stalls (stall barrier system development, without stall barrier system engaged, with critical ice shapes, and/or below 5,000' Hp)
- Intentional speeds above Vfc/Mfc
- Flight control malfunction during landing and takeoff phases of flight
- Autopilot malfunctions at very low altitude
- Single-brake braking performance
- Low-altitude/high-speed pitot-static calibration
- Deterrent Buffet
- CTO at maximum TOGW

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CHAPTER 3

GENERAL GUIDELINES & PROCEDURES

3.1.0. DUTY UNIFORM

Normal daily uniform is business casual attire. The daily-wear "golf" shirts with department logo are provided by Flight Operations. Replacement shirts are issued on a recurring interval basis. Additionally, one "Captain's" dress uniform is provided by Flight Operations.

It is the pilot(s) responsibility to coordinate the desired attire with the appropriate point-of-contact if supporting briefings, demonstration flights, static displays, etc.

3.2.0 CREW ENDURANCE / CREW REST

Flight testing demands flexibility with scheduling; therefore, there is not an established daily arrival and departure time. Every test pilot is classified as exempt (a.k.a., salaried employee) and will comply with Gulfstream Corporate Policy Number CP-6-46. Nominal daily duty hours are 0830L to 1700L. Flight Operations is also mandated to provide flight crew availability every weekend. A duty roster is maintained by the flight scheduler and establishes one flight crew for weekend duty on a rotational basis. Additional crews will be scheduled for weekend duty, when necessary.

The normal duty day should not exceed a maximum of 12 hours. A duty day is defined as the time an individual arrives at the work place until the time he/she departs. The type of testing being performed can influence the maximum number of duty hours authorized. Flight crews performing low-risk maneuvers have a maximum duty day of 12 hours. Maneuvers classified as medium or high-risk will not be performed after any crewmember has exceeded a 10-hour duty day. Risk levels for each test are defined in section 2.3.0.

A duty day will be followed by at least 12 hours of off-duty time. A minimum of eight, uninterrupted hours will be afforded for crew rest. An individual will not work more than 13 continuous days or more than 60 hours in a 7-day period.

Exceptions to the crew endurance / crew rest policy will be approved individually by VP Flight Operations, Chief Test Pilot, or their designated representative. Prior to submitting for an exception, all of the crewmembers must agree to the policy modification.

3.3.0. TRAINING

Scheduling for aircraft initial / refresher training will be coordinated through the Flight Ops Training Officer. The biennial refresher course requirement will be satisfied by attending the appropriate course(s) at FlightSafety International.

Individuals qualified as DERs and/or DAS ARs will attend the FAA refresher course(s) biennially.

3.4.0. FLIGHT TEST AREAS

Savannah, GA / Brunswick, GA

The Flight test areas described below have been coordinated for use when operating from Savannah, GA or Brunswick, GA and comply with requirements of FAR 91.305. They may be modified by ATC to the extent necessary for traffic avoidance or weather. The primary flight test area for inflight maneuvers is within the warning areas, east of the Georgia coast.

A. **Flight Test Area 1-** designated as the primary test area. It is located offshore in the FAR 73 Special Use Airspace commonly referred to as the "Warning Area". It specifically includes all the airspace normally controlled by the US Navy Fleet Area Control and Surveillance Facility in Jacksonville, Fl. It is identified on aeronautical charts as W-132, W-134, W-157, W-158 and W-159. The physical description of these special use areas may be found in FAA Order 7400.8G. These areas are used under a Letter of Agreement between Gulfstream, the US Navy and Jacksonville Center, which are the controlling authorities.

Flight Test Area 2- designated as one of the primary test areas when it is necessary to conduct tests on airways or with ATC assistance. An IFR flight plan will be filed and flights will be under the control of Jacksonville Center. Area 2 is normally bounded by Savannah, Ga., Charleston, SC., Florence, SC., Savannah, Ga., with a 10nm buffer zone around this area to allow flying from point to

point. The area may be modified by ATC to provide proper separation of test activities and commercial traffic. Altitude is as authorized by the controlling agency and aircraft operating limitations.

Flight Test Area 3- designated as a secondary flight test area when required for weather or other considerations. The block altitude will normally be from sea level to 18,000 feet MSL. Area 3 is designated as follows: from SAV VOR out the 082 radial for 55nm, then southwest along the East Coast remaining east of V1 airway to a point on the SAV VOR 176 radial at 49nm-then follow the 176 radial to the SAV VOR.

Flight Test Area 4-an area of 30 NM radius from Allendale, South Carolina VOR to be used for medium altitude (10,000 ft. - 18,000 ft.) flight test and training.

Alternate airports - Hunter Army Airfield (KSVN), Savannah, GA and Brunswick Golden Isles (KBQK), Brunswick Georgia.

B. Filing Flight Plans:

1. The following Gulfstream stereo routes have been established with the FAA and are filed (1 800 WX BRIEF (992-7433)) utilizing the :

   a) Tell the Briefer that you are from Gulfstream and would like to file a "stereo flight plan". If the briefer is not familiar with how to do this use the following steps.
   b) Flight Plan Type: select "STEREO"
   c) Aircraft ID: GULFTEST (GLF) XX (where XX is the GULFTEST number assigned to the pilot).
   d) Departure Point: SAV or BQK.
   e) Proposed Departure Time: XX:XX Zulu.
   f) Route of Flight: GLFSTRM 1 or 2 / BQK 1 or 2
   g) Click "File". The briefer should get a message saying "Flight Plan Filed Successfully".

2. Warning area activity briefings can be obtained through the U.S. Navy controlling agency, FACSFACJAX, "SEALORD," at ----------. Upon receiving a preparation message (after flight plan is filed), SEALORD will call Flight Ops Scheduling ---------- if the traffic in the area is such that they can not accommodate the proposed test flight.

Long Beach, CA

The primary flight test area for inflight maneuvers is within the W-291 warning area, south of Long Beach, CA and it complies with requirements of FAR 91.305. There is a stereo-route flight plan stored with Hawthorne FSS (direct phone no. ----------) and is identified as number 11. Inform FSS of the type of aircraft with equipment suffix, POBs, and aircraft color. Flight plan number 11 establishes an IFR-VFR-IFR routing from KLGB; direct to SHOTS intersection at 10,000 ft altitude and 300 kts; transition into W-291 on the SXC 170° radial and 50 DME (3-hr VFR delay); then direct to SHOTS, SXC, SLI, KLGB.

The US Navy is the controlling agency for W-291 and utilizes "Beaver Control" as the radio callsign on frequencies -------- or --------. Prior to flight, contact FACSFAC San Diego (----------) and advise them of your intentions. Expect to work between the 180° and 200° radials from SXC VORTAC and between the 50 and 200 DME arcs. The KLGB midfield engine run-up area is the primary location for engine high-thrust operations. The midfield run-up area is located south of the D and G taxiways intersection.

Appleton, WI, Dallas, TX, and other locations (e.g. GDAS facilities)

There are no specific test locations that have been coordinated with the FAA. Pilots will select operating areas that comply with the intent of FAR 91.305.

3.5.0. FLIGHT TEST WEATHER MINIMUMS AND SUPPORT REQUIREMENTS

Weather, equipment, and support requirements, with respect to the specific test, are provided in the following table. More stringent weather requirements may be established based on pilot or management judgment.

Satisfying the radio monitor requirement can be done through ATC, Gulfstream Flight Test ([redacted] MHz), Production Dept. ------ "WCM9" ([redacted] MHz), or Flight Operations "KGO4" ([redacted] MHz). Parachute, observer, and/or chase requirements will be specified in an approved Flight Test Plan. The Chief Test Pilot, VP Flight Operations, or their designated representative must approve deviations from these criteria. Flight categories are defined in section 3.10.0.

Table: Weather Minimums and Support Requirements

	Airport Weather	Land By Sunset	Radio Monitor	Parachute	Observer	Chase
Experimental & Developmental 1st Flight	5000/5 Clear path to field	Required	Required	As Required	As Required	As Required
Experimental & Developmental 2nd & Sub. Flights	1500/3*	Required	Required	As Required	As Required	As Required
Engineering Flights	1500/3*	As Required**	Required	As Required	As Required	As Required
Production & Completion 1st Flight	1000/3	Required	Required	N/R	N/R	N/R
Production & Completion 2nd Flight	1000/3	As Required**	Required	N/R	N/R	N/R
Production & Completion 3rd & Sub. Flights	IFR Circling Minimums	As Required**	Required	N/R	N/R	N/R
Other Test Flights	IFR Straight-in Minimums	As Required**	Required	N/R	N/R	N/R
Customer & Delivery Flights	IFR Straight-in Minimums	N/R	N/R	N/R	N/R	N/R

* Or as determined by Chief Test Pilot.

** The following maneuvers are restricted to being performed during daylight hours only: Spoiler Control (Speedbrake Blowdown); Stalls; Engine handling/accelerations (non-FADEC equipped airplanes); Engine Airstarts; Electrical System configuration changes; High-speed flight (at and above Vmo/Mmo); Other than normal flight control configurations; EGPWS callouts; Low-altitude gear unsafe tones; Landing Gear alternate extension; Maximum Thrust Reverser operation following landing (first application); and Maximum Anti-skid braking to full stop following landing (first application).

3.6.0. USE OF PARACHUTES

Parachutes will be carried on all first flights of a new aircraft design and on designated flights of a hazardous nature as prescribed by the Chief Test Pilot or VP of Flight Operations. On these occasions the aircraft will be configured to facilitate safe egress by the crew. Such configuration will normally consist of a jettisonable baggage door, an extendable air deflector forward of the baggage door, and a device to aid the crew's travel from the cockpit aft, such as a knotted rope. Parachutes will be of the backpack type and may either be worn or stowed in the cabin on suitable hangers. Flight Operations will insure that all crewmembers involved in experimental test flights are thoroughly familiar with usage of the specific parachutes and other equipment through initial egress training and periodic refresher drills.

3.7.0. BAILOUT PROCEDURE

In the event that bailout is required and if time and conditions permit, proceed to the Savannah VOR 165° Radial and 14-17 DME for bailout. The airplane should be established on the radial outbound with sufficient time to allow for wind correction and so that the parachute landing will occur between the 14 and 17 mile DME points. Minimum altitude for successful bailout will depend upon classification of parachute. The following optimum procedure for bailout resulted from tests of cargo drops from the aft baggage door of a normally configured Gulfstream:

- Stabilize on Autopilot at 160 KIAS with 10° flaps selected
- Match cabin altitude to actual altitude
- Pressurization Selector-Manual, Outflow Valve - OPEN
- Both bleed air switches - CLOSED
- Open baggage door
- Bailout - Dive for points low and aft of flap trailing edge

3.8.0. ENGINE SHUTDOWN

In the interest of safety, whenever an engine is to be shutdown, the pilot shall maintain a minimum altitude of 10,000-ft. AGL, unless an approved test plan dictates a lower altitude.

3.9.0. FORMATION FLYING

Formation flying will be performed only when necessary to accomplish the mission. **The minimum wingtip separation is one wing semi-span. Formation is limited to two ship only unless approved by Senior Vice**

President of Programs, Engineering, & Test. Photographic flights will require the approval of the Senior Vice President of Programs, Engineering, & Test. An authorized pilot must be seated at one set of flight controls in each aircraft. Pilots will be authorized for formation flying by VP Flight Operations or the respective Director of Demonstration or Test. The Safety Officer and Scheduling Officer will maintain a list of the authorized pilots. Formation flying performed outside the Savannah, GA local flying area will be approved by VP Flight Operations.

Formation Pilot Qualifications and Currency: No pilot may participate as pilot in command of any Gulfstream formation activity without the express approval of the Chief Pilot or his assigned representative. A list of qualified and approved formation pilots will be kept by the Chief Pilot, his assigned representatives, and Flight Operations schedulers. In addition, selected pilots with extensive experience flying Gulfstream aircraft in formation events are designated as formation instructors. Only pilots with previous formation experience are qualified as candidates to participate in any formation activity or training. Approved formation pilots are considered current if they have participated in a formation event anytime within the previous 12 months. If out of currency, they may perform formation duties with another formation qualified pilot who is current. Note that qualifications and currency requirements apply to both wing and lead positions.

Formation flying is classified as medium risk and therefore only necessary crewmembers are authorized for flight. Exceptions to additional personnel on any airplane in the formation must be approved by the VP Flight Operations or the Chief Test Pilot. If any airplane within the formation includes personnel not essential to the conduct of the flight, aircraft spacing will be no closer than one wing-span.

Formation Training: Formation training for pilots new to Gulfstream is performed on an as available basis. There are no dedicated missions provided for this purpose. Only pilots with previous formation experience are qualified to be candidates. Training will consist of reviewing the Gulfstream Flight Operations Formation Procedures and Briefing Guide and participating in at least one formation event with an experienced Gulfstream formation instructor. At the completion of training, instructors will complete a Formation Training Record summarizing the candidate's performance as either qualified or not qualified to participate in formation flying. Some qualifications can be conditional based on the instructor's recommendation for more training. Candidates who are

qualified will not participate as pilot in command in any formation activity. An original copy of the Formation Training Record will be kept in the pilot's personnel folder under "Designations" in Dispatch.

A detailed pre-flight briefing will be completed using the information below as a guide.

TIME HACK

FORMATION CALL SIGN – Gulftest 21 [lead aircraft], Gulftest 22, 23, 24, . . . [subsequent wingmen]. The formation will consist of _____ aircraft.

FLIGHT PLAN – The flight plan has been filed (review routing)

PURPOSE – (Detailed flight briefing)

RADIO FREQUENCIES – Interplane: primary [redacted] MHz, secondary [redacted] MHz. Review expected ATC frequencies. Maintain strict radio discipline. All check-ins and other communications within the formation will be on interplane frequency.

FORMATION CHECK-IN – Check in 5 minutes prior to start on Interplane frequency (e.g., Lead will transmit "Gulftest 21, flight check in." The proper response is "Two" [Gulftest 22], "Three" [Gulftest 23], etc.)

CLEARANCE – Lead aircraft will obtain clearance prior to engine start. All aircraft will copy the clearance; no response is necessary. If there are any questions concerning the clearance, discuss on interplane frequency.

ENGINE START – Engine start will be at _____ [time].

TAXI – Lead will request taxi clearance for all aircraft in the formation. Taxi interval will be one aircraft length. When appropriate, Lead will announce "Gulftest 21, Flight go tower." Wingmen will respond "Two," etc. Lead will request takeoff clearance for all aircraft in formation.

LINE-UP AND TAKEOFF – Lead will line-up on downwind side of runway and ensure Two is in position before advancing engine thrust. Two will begin takeoff roll when Lead rotates. To avoid FOD, subsequent aircraft in the formation will take position in pairs for takeoff.

JOIN-UP – After takeoff, climbout will be straight-ahead (if possible) and Lead will maintain _____ knots (recommend 180 kts) and moderate rate of climb (recommend 1500 ft/min) until Trail notifies that the flight is formed. Unless specifically required for data acquisition (e.g., RVSM), close formation is not authorized.

ENROUTE – Lead will navigate for the flight. Unless directed otherwise by ATC, transponder selection will be Normal for Lead and Standby for all other aircraft in the formation. Consideration needs to be given to different types of aircraft in the formation and their specific flying

qualities. If at all possible, Lead should not use maximum or idle thrust settings. Lead will announce all configuration changes.

LEAD CHANGE- Lead will direct all lead changes. "Gulftest 21 Flight lead change". Formation wingman will separate by one wing span and commence lead change. When in position, new lead will announce "Gulftest 22 has lead on the right/left"

EMERGENCY PROCEDURES-Appropriate to the mission (flutter, first flight, etc)

DESCENT – Lead will announce descent.

APPROACH AND LANDING – If required for approach, the formation may be required to break up for landing. If that is necessary, each aircraft will be responsible for ATC radio and transponder requirements. For an overhead approach, Lead will determine the direction of the break and direct a formation change to an echelon opposite the break direction. Lead will break over the approach end of the runway, unless otherwise instructed by ATC. Break roll angle will be 30 to 45 degrees. Subsequent aircraft will break at 4-second intervals and establish appropriate spacing on downwind and turn to final. The fastest aircraft will determine approach speed. Before landing, it is not necessary to wait for the previous aircraft to clear the runway; however, ensure that there will be sufficient spacing so that heavy braking is not required. Clear the runway as expeditiously as possible and taxi to parking.

INADVERTENT WEATHER PENETRATION/LOST SIGHT – In event of inadvertent weather penetration, Lead will announce "Execute weather penetration procedure, Gulftest 21 [base heading] ____ degrees, [airspeed] _____ knots, [base altitude] _____ feet." If climbing or descending, the formation will level off at current altitude. Two will immediately climb to base altitude +500 ft, Three will fly base altitude – 500 ft, and Four will fly base altitude –1000 ft. Aircraft on the right-hand side of lead will change heading 30 degrees to the right, hold that heading for 30 seconds, and then return to the original heading. Aircraft on the left-hand side of lead will change heading 30 degrees to the left, hold that heading for 30 seconds, and then return to the original heading. Lead will notify ATC of actions taken and request handling.

3.10.0. EXPERIMENTAL/DEVELOPMENTAL/ENGINEERING TEST FLIGHTS

All flights classified as experimental, developmental, or engineering shall be performed in coordination with GAC Flight Test Department. Experimental flight testing is defined as flight testing which investigates the characteristics of an aircraft or its components under conditions not previously tested. Examples include first flights, envelope expansion and

initial performance or flying qualities testing of new or significantly modified vehicles. Developmental flight testing is defined as flight testing which conducts the initial investigation of the effects of any engineering or design change to an aircraft or its components. Examples include structural changes, control law development, and certain systems tests. Engineering evaluations are test flights which cannot be considered experimental or developmental, but do gather data not previously acquired. These definitions are independent of the type of airworthiness certificate issued for the flight. A production or completion flight operated under an experimental airworthiness certificate is still a production/completion flight. It is not considered an experimental flight.

The Chief Test Pilot will assign a project test pilot and alternate as required. The project test pilot will be the Flight Operations Dept. primary point-of-contact for the test program status. The Chief Test Pilot will detail the project test pilot's duties, tailored for the specific program.

A. **Crew Selection** – Pilots and Flight Test Engineers will be assigned with respect to the test maneuvers that are to be performed on the flight. Crew selection is based on the testing to be performed and also on individual training, qualifications, experience, availability, and project assignment.

   The FTE will determine the risk level of the flight with reference to section 2.3.0, which assigns a risk level to specific test maneuvers. The risk level for the flight will be relayed through the Test Coordinator and placed on the flight request. This procedure allows appropriate pilot assignment by the Flight Scheduler. The Flight Scheduler will reference the pilot classification list and assign a pilot-in-command that is authorized to perform that type of flight test operation. Pilots are classified with respect to training, qualifications, and experience. The VP FltOps and the Chief Test Pilot will approve the pilot classification list. The Flight Scheduler will maintain the pilot classification list.

B. **Pre-flight Briefing** – The pre-flight briefing will consist of aircraft maintenance status and a detailed review of the conduct of the flight. A flight test card packet will be used to organize the conduct of the brief and the performance of the flight. The flight test card packet will consist of the following: standardized cover sheet, weight and balance forms, test cards, applicable Test Safety Hazard Analysis (TSHA) sheets, Interim Flight Restriction(s) (IFRs) synopsis, and Operational Limitations Note (OLN) synopsis. A sample of the

cover sheet is presented below. The test cards (at least a draft version) should be provided to the assigned pilots one day prior to the proposed flight. Having the test cards one day prior provides the pilots an opportunity to become familiar with the testing and allows for timely revisions (if necessary). In order to provide a standardized location for the personnel onboard the aircraft, they will be listed on the aircraft flight release form.

C. **Post-flight Briefing** – A post-flight briefing will be conducted. In addition to reviewing the results of the testing, the flight crew will classify aircraft discrepancies as either aircraft maintenance or engineering. The discrepancy classification is based upon whether the cause is aircraft generic or as a result of test-specific items.

Gulfstream
A GENERAL DYNAMICS COMPANY

GIV-X

Reg No: N401SR **Serial No: 4001** Flight No: **220** Date: **03-Jun-04**

ZERO FUEL WEIGHT: TAKEOFF GROSS WEIGHT: FLAPS: FLEX (Rated)
ZERO FUEL C.G.: TAKEOFF C.G. V1/VR: VFS:
FUEL LOAD: **28000** V2: VSE:
FIELD: VREF:

[redacted] Gulfstream Flight Test Frequencies [redacted]

CONFIGURATION / TEST SUPPORT (Items of special interest <--)

G-IVX Flight Test Config (w/Final SSEC Config)
GIV PV 8.2.4
FADEC -02 HW 13.0 S/W + Trim File
APU ECU P/N 2116084-3501, S/W G4-00-01
DACU s/n 0007, S/W 0V7
G-IVX Drag Mods Installed
DGPS Unit in cabin and Antenna installed
Wx Station TM Antenna installed
Precooler Mod
Calibrated RH TRU Installed
Conformed Pylon Seals Installed
Start Air Valve Instrumentation Installed
Total Temp Probe Installed RH Fwd Cabin Window
Trailing Cone Installed
Kiel Probe Installed

LIMITATIONS / RESTRICTION

IFRs GIVX-02-001
IFRs GIVX-03-004, -005
IFRs GIVX-03-014, -015, -019
OLN Tay611-8C-85001-02 Amdt 25
OLN Tay611-8C-85002-02 Amdt 25

HAZARDS/TSHAs

Emergency Equipment
1 ELT
2 Life Raft
3 Fire Extinguishers (3) Fire Axe
4 First Aid Kit
5 Life Preservers (1 per seat)
6 Pax O2 bottles (1 per seat)

PURPOSE OF TEST:
TIA 5C Flying Qualities (FAA)

CREW

[redacted]

CYCLE COUNT

Total Cycles Prior to Flight: _____

_____	Takeoffs (Flex)	x1	_____
_____	Takeoffs (Rated)	x3	_____
_____	Touch Go's (Flex)	x0.2	_____
_____	Touch Go's (Rated)	x1.5	_____
_____	Go-Arounds (Flex)	x0.2	_____
_____	Go-Arounds (Rated)	x1.5	_____
	TOTAL Cycles This Flight:		_____

Total Cycles All Flights: _____
Cycles Remaining: _____

LOG TIMES:

ENGINE START _____/_____
ENG SHUT DOWN _____/_____

CHOCKS IN _____
TAXI _____
BLOCK TIME _____

LANDING _____
TAKEOFF _____
FLIGHT TIME _____

PRIOR FLIGHT TIME _____
TOTAL FLIGHT TIME _____

Aircraft Configuration Release- Test Coordinator

Aircraft Configuration Acceptance- Flight Test Engineer

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APPENDIX 1:

MEMORANDUM OF UNDERSTANDING FOR FAA/GAC FLIGHT TEST SAFETY AND RISK ASSESSMENT

Gulfstream®
AEROSPACE CORPORATION

November 9, 1998
A&C-FAA-98-416

Mr. Roger D. Anderson
Department of Transportation
Federal Aviation Administration
Atlanta Aircraft Certification Office
One Crown Center
1895 Phoenix Boulevard, Suite 450
Atlanta, Georgia 30349

Subject: Proposed GAC/FAA Flight Test Safety and Risk Assessment

Dear Mr. Anderson:

Enclosed for your signature is the proposed GAC/FAA Flight Test Safety and Risk Assessment Memorandum of Understanding. This document incorporates the last comments that were given to Gulfstream and has been signed by Gulfstream management and flight test management. A space has been provided for Mr. Gene Bollin to sign on behalf of the FAA. Please have him sign it and return a copy to Gulfstream.

Very Truly Yours,

[redacted]

Richard L. Johnson
Chief Engineer & Acting Manager
Airworthiness & Certification

cc: N. Berryman, ACE-118A
G. Bollin, ACE-116A
P. Sconyers, ACE-117A

[redacted]

Memorandum of Understanding

Flight Test Safety and Risk Assessment
between
FAA Atlanta Aircraft Certification Office and Gulfstream Aerospace Corporation

I. INTRODUCTION

This Memorandum of Understanding (MOU) between the Federal Aviation Administration Atlanta Aircraft Certification Office (AACO) and Gulfstream Aerospace Corporation (GAC) is intended to establish a jointly agreed upon flight test risk assessment program for FAA Type Certification and Supplemental Type Certification programs conducted by GAC or associated Completion and Service Centers. This MOU will serve as the guideline to insure an acceptable level of risk is established and maintained for all FAA flight test activities.

II. OBJECTIVE

This MOU coordinates GAC's Flight Test Risk Assessment/Risk Alleviation process and the FAA Risk Assessment Program as required by FAA Order 4040.26 to establish an Accepted Risk Assessment Process for evaluating and minimizing hazard levels in FAA certification testing.

III. REFERENCES

1. FAA Order 4040.26 Aircraft Certification Service Flight Safety Program
2. FAA Procedures Manual No: A-23-115A Flight Test Risk Management and Risk Assessment Process
3. Gulfstream Aerospace Corporation Flight Test Standard Practices Manual (GV-GER-1329) Section 5 Risk Assessment/Risk Alleviation
4. Gulfstream Aerospace Corporation Flight Operations Manual - Revision 4 dated 11/1/97

IV. TEST PLANNING

GAC is responsible for planning the test program and providing documentation to the FAA that outlines the means of compliance with Federal Regulations. Future documentation will also include an assessment of the risk involved in the Certification flight test program (see procedures below). This documentation will be coordinated with the FAA Program Manager (PM) and the AACO is responsible for providing their approval with the proposed means of compliance. In addition, the AACO will provide concurrence with the GAC Risk Assessment prior to issuance of the TIA. The FAA must be given an adequate time for review and approval. Two to four weeks is considered adequate time for review and approval. Changes to the Certification Flight Test program after release of the TIA must be subjected to the Risk Assessment/Alleviation procedures specified by GAC standard practices and submitted to the AACO for concurrence.

V. TEST CONDUCT

The Flight Test Techniques used during FAA Certification Programs will be those procedures refined and successfully utilized during GAC development testing or prior Certification programs. If such procedures differ from published FAA guidance material, differences must be resolved by preparation of an Issue Paper and coordinated with FAA Transport Airplane Division. For HIGH risk test points and those unique situations where a test point is being conducted for the first time with FAA Flight Test personnel for Certification credit, the pilot flying will be coordinated between FAA and GAC test crews to insure the highest level of safety is maintained.

Testing conducted during an FAA test flight will be limited to the test points and procedures reviewed during the preflight briefing and documented on the Flight Test Cards. Exceptions to this can be considered if the deviations are minor, have an insignificant impact on the planned flight and are approved by the GAC Pilot in Command. The preflight briefings will also include a review of applicable Test Safety Hazard Analysis (TSHAs) that have been generated for any MEDIUM or HIGH risk testing. These documents provide procedures for risk mitigation and are the basis for establishing an acceptable level of risk.

All flight testing shall include necessary environmental precautions appropriate to the planned test and test location (e.g., over water, arctic, desert, etc.). All tests identified as MEDIUM or HIGH risk shall be completed no less than one hour prior to sunset to allow adequate time for search and rescue efforts.

VI. RISK LEVEL

FAA may not participate in testing rated by GAC as HIGH Risk without written authorization from the Manager, AACO. FAA personnel participating in LOW and MEDIUM risk level tests will be governed by the GAC Flight Test Risk Assessment/Alleviation process.

VII. STAFFING

FAA personnel that could be involved with flight testing includes Flight Test Pilots, Flight Test Engineers and Engineering Specialists. GAC will be notified of FAA personnel expected for each series of tests. The FAA will try to minimize personnel changes during a certification program in order to provide continuity. It is possible that additional FAA personnel may be brought into the program to facilitate meeting GAC schedules or that personnel may be rotated to meet other FAA commitments.

VIII. TRAINING

GAC will provide informal training for all FAA personnel who participate in the flight test program. Follow-on training and training of replacement personnel will also be provided by GAC.

FAA will provide formal training as required to assure that all personnel participating in GAC flight tests are properly qualified. This training shall include survival and physiological training as well as pilot proficiency training as necessary to maintain currency in category and class aircraft.

IX. DUTY TIME

FAA Flight Crew Members will observe the Crew Duty and Crew Rest requirements specified in the GAC Flight Operations Manua l (see Ref. 4).

The FAA Flight Crew Members must approve any request to extend the prescribed Crew Duty/Rest requirements prior to obtaining concurrence from GAC's Chief Test Pilot.

X. PROCEDURES

GAC will provide a Risk Assessment section in all Certification Flight Test Plans submitted for Type Certification projects. This section will specify the level of risk involved and identify testing that is considered either MEDIUM or HIGH Risk.

GAC will provide a Risk Assessment section in all Certification Plans submitted to the AACO for Completion Center and Service Center STC projects. This section will specify the level of risk involved and identify testing that is considered either MEDIUM or HIGH Risk.

GAC will provide Test Safety Hazard Analysis forms that define procedures for minimizing the associated hazards for all test points that are either MEDIUM or HIGH Risk.

GAC will convene Safety Review Boards for FAA programs when Certification testing exceeds the scope or risk of GAC Development testing.

GAC's FAA Coordinator will provide notification of SRB activity relating to FAA Test Programs.

GAC will notify FAA of any changes to the corporate Safety Review Process.

FAA will participate as an observer in GAC Safety Review Boards (SRB) that are convened for Certification Testing as required.

FAA will concur with the proposed risk assessments provided in the Certification Documentation mentioned above prior to issuance of the TIA.

FAA will obtain written authorization from the ACO Manager to participate in any testing classified as HIGH risk.

FAA will include in the 18B Section of each TIA a statement for the Flight Test Pilot to review the TSHAs for possible safety precautions to incorporate in the conduct of testing.

FAA Flight Test Crew members will review each Test Safety Hazard Analysis (TSHA) and must concur with the proposed risk alleviation methods prior to conducting any FAA Test Flight.

XI. CONCLUSION

FAA has reviewed the GAC processes for Flight Test Safety and Flight Operations and considers them acceptable to establish an adequate level of safety for FAA Flight Test programs conducted for the purposes of Type Certification and/or Supplemental Type Certification.

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