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Flight Standardization Board (FSB) Report

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Manufacturer
Bombardier, Inc.

Type Certificate Data Sheet (TCDS)	TCDS Identifier	Marketing Name	Pilot Type Rating
T00003NY	BD-700-1A10	Global Express	BBD-700
T00003NY	BD-700-1A10	Global Express XRS	BBD-700
T00003NY	BD-700-1A10	Global 6000	BBD-700
T00003NY	BD-700-1A11	Global 5000	BBD-700
T00003NY	BD-700-1A11	Global 5000 GVFD	BBD-700

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1. RECORD OF REVISIONS

Revision Number	Sections(s)	Page(s) Affected	Date
Original	All	All	07/14/1999
1	All	All	01/14/2005
2	Contents, Highlights of Change, 2.1, 7.1, 9, 10, 11, Appendix 3, Appendix 6, Appendix 7	2, 4, 6, 10, 11, 12, 13, 22, 23, 49, 50, 51, 52, 53, 54, 55, 56, 57	09/02/2005
3	Appendix 6	52	08/28/2008
4	Appendix 8	61	04/04/2012
5	All	All	06/21/2018

2. INTRODUCTION

Aircraft Evaluation Groups (AEG) are responsible for working with aircraft manufacturers and modifiers during the development and Federal Aviation Administration (FAA) certification of new and modified aircraft to determine: 1) the pilot type rating; 2) flightcrew member training, checking, and currency requirements; and 3) operational suitability.

This report lists those determinations for use by: 1) FAA employees who approve training programs; 2) FAA employees and designees who certify airmen; and 3) aircraft operators and training providers to assist them in developing their flightcrew member training, checking, and currency for Certificated Operators.

3. HIGHLIGHTS OF CHANGE

The purpose of this revision is to add Appendices for Required Navigation Performance Authorization Required (RNP AR), Honeywell Batch 3 software, Global Vision software Version 4.5.8 (marketed as 4.5), and Global Vision Flight Deck (GVFD) software Version 5.1.3 (marketed as 5.0). The Bombardier Enhanced Vision System (BEVS) Appendix has also been revised.

Administrative editing has been made throughout the document for clarification, FAA writing guidelines, and revised Flight Standardization Board (FSB) report requirements. Due to significant changes and a new report format, revision bars are not used in this revision.

4. BACKGROUND

The Long Beach AEG formed an FSB that evaluated the BD-700-1A10 as defined in FAA Type Certificate Data Sheet (TCDS) # T00003NY. The evaluation was conducted in May 1999 using the methods described in FAA Advisory Circular (AC) 120-53, Crew Qualification and Pilot Type Rating Requirements for Transport Category Aircraft Operated under FAR Part 121.

“Global Express” is a marketing designation for the Model BD-700-1A10 aircraft. The Global Express was found to be operationally suitable.

In August and September 2004, the FSB evaluated the BD-700-1A11 aircraft as defined in FAA Type Certificate Data Sheet (TCDS) # T00003NY. The evaluation was conducted using the methods described in AC 120-53. “Global 5000” is a marketing designation for the Model BD-700-1A11 aircraft. The Global 5000 was found to be operationally suitable.

In the fall of 2004, the FSB evaluated the Thales Head-Up Display System (HUD) for the Global Express and Global 5000 aircraft. It, as well as the associated Airplane Flight Manual (AFM) change, was found to be operationally suitable for all phases of flight including U.S. CAT I and CAT II operations when authorized. Training, checking, and currency requirements are listed in Appendix 4, Thales Head-Up Display (HUD) System.

In December 2004 through May 2005, the FSB evaluated the BEVS for the Global Express and Global 5000 aircraft. It, as well as the associated AFM change, was found to be operationally suitable. Training, checking, and currency requirements are listed in Appendix 5, Bombardier Enhanced Flight Vision System.

In January 2005, Bombardier introduced changes to the BD-700-1A10 Global Express aircraft. These changes included improved performance, increased range with the addition of a forward fuel tank, fast refueling technology, and new cabin features such as increased cabin pressurization. Other optional features became standard equipment, including the BEVS. This improved version of the BD-700-1A10 became the new production model and is marketed as the “Global Express XRS”. The Global Express and Global Express XRS may be referenced together in this report as “Global Express/XRS”.

In January and February 2012, the FSB evaluated the BD-700-1A10 aircraft equipped with GVFD, which is marketed as the “Global 6000”, and also the BD-700-1A11 aircraft equipped with GVFD, which is marketed as the “Global 5000 GVFD”. The evaluation was conducted using the methods described in AC 120-53A, Guidance for Conducting and Use of Flight Standardization Board Evaluations. The GVFD Software Version evaluated was Software Version 4.3.1. The Global 6000 and Global 5000 GVFD were both found to be operationally suitable. Training, checking, and currency requirements are listed in Appendix 6, Global Express/XRS to Global 6000 and Global 5000 to Global 5000 GVFD.

In December 2012, the FSB evaluated the Global Express and Global 5000 Honeywell Batch 3 Software Upgrade. It, as well as the associated AFM change, was found to be operationally suitable. Training, checking, and currency requirements are listed in Appendix 7, Honeywell Batch 2+ to Batch 3 Software Upgrade.

In June 2013, the FSB evaluated the GVFD Software Version 4.3.1 (Version 3) to 4.5.8 (Version 4.5) Software Upgrade. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 8, Global Vision Flight Deck (GVFD) Software Upgrade Version 4.3.1 (Version 3) to 4.5.8 (Version 4.5).

An FSB was convened on June 20, 2013, to evaluate operational suitability and to determine training, checking, and currency requirements for conducting steep approaches in the

Global 5000/6000 aircraft. FSB member training and flying took place at the Bombardier Aerospace facility in Wichita, Kansas. Certification flight testing had been completed prior to the FSB.

In April 2016, the FSB evaluated the GVFD Software Version 4.5.8 (Version 4.5) to 5.1.3 (Version 5) Software Upgrade. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 10, Global Vision Flight Deck (GVFD) Software Upgrade Version 4.5.8 (Version 4.5) to 5.1.3 (Version 5.0).

5. ACRONYMS

14 CFR	Title 14 of the Code of Federal Regulations
AC	Advisory Circular
ACP	Audio Control Panel
ACS	Airman Certification Standards
ADF	Automatic Direction Finder
ADS-C	Automatic Dependent Surveillance–Contract
AEG	Aircraft Evaluation Group
AFCS	Automatic Flight Control System
AFM	Airplane Flight Manual
A/P	Autopilot
APCH	Approach
BATC	Bombardier Aircraft Training Center
BEVS	Bombardier Enhanced Vision System
CCP	Cursor Control Panel
CNS	Communication, Navigation, Surveillance
CPDLC	Controller-Pilot Data Link Communications
CTP	Control Panel
DA	Decision Altitude
DC	Direct Current
ECL	Electronic Checklist
EFB	Electronic Flight Bag
EFVS	Enhanced Flight Vision System
EGPWS	Enhanced Ground Proximity Warning System
EFIS	Electronic Flight Instrument System
EICAS	Engine Indication and Crew Alerting System
EMS	Electrical Management System
EVS	Enhanced Vision System
FAA	Federal Aviation Administration
FCOM	Flightcrew Operating Manual
FDA	Flight Director Annunciator
FFS	Full Flight Simulator
FGP	Flight Guidance Panel
FMS	Flight Management System
FSB	Flight Standardization Board

FSTD	Flight Simulation Training Device
FTD	Flight Training Device
GPS	Global Positioning System
GVFD	Global Vision Flight Deck
HF	High Frequency
HSI	Horizontal Situation Indicator
HUD	Head-Up Display
IAF	Initial Approach Fix
IFIS	Integrated Flight Information System
IR	Infrared
LNAV	Lateral Navigation
LOE	Line Operating Experience
LPV	Localizer Performance with Vertical Guidance
MDR	Master Differences Requirements
MKP	Multifunction Keypad
NAS	National Airspace System
NAV	Navigation
OEI	One Engine Inoperative
OMR	Operating Manual Revision
PBN	Performance-Based Navigation
PFD	Primary Flight Display
PM	Pilot Monitoring
PTS	Practical Test Standards
QRH	Quick Reference Handbook
RF	Radius-to-Fix
RNP	Required Navigation Performance
RNP AR	Required Navigation Performance Authorization Required
SOP	Standard Operating Procedures
STC	Supplemental Type Certificate
SVS	Synthetic Vision System
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Alert and Collision Avoidance System
TCDS	Type Certificate Data Sheet
TO	Takeoff
TOLD	Takeoff and Landing Data
VGP	Vertical Glide Path
VHF	Very High Frequency
VNAV	Vertical Navigation
VPATH	Vertical Path
WAAS	Wide Area Augmentation System

6. DEFINITIONS

These definitions are for the purposes of this report only.

- 6.1 **Base Aircraft.** An aircraft identified for use as a reference to compare differences with another aircraft.
- 6.2 **Current.** A crewmember meets all requirements to operate the aircraft under the applicable operating part.
- 6.3 **Differences Tables.** Describe the differences between a pair of related aircraft and the minimum levels operators must use to conduct differences training and checking of crewmembers. Difference levels range from A to E.
- 6.4 **Master Differences Requirements (MDR).** Specifies the highest training and checking difference levels between a pair of related aircraft derived from the Differences Tables.
- 6.5 **Mixed Fleet Flying.** The operation of a base aircraft and one or more related aircraft for which credit may be taken for training, checking, and currency events.
- 6.6 **Operational Evaluation.** An AEG process to determine pilot type rating, minimum crewmember training, checking and currency requirements, and unique or special airman certification requirements (e.g., specific flight characteristics, no-flap landing).
- 6.7 **Operational Suitability.** An AEG determination that an aircraft or system may be used in the National Airspace System (NAS) and meets the applicable operational regulations (e.g., Title 14 of the Code of Federal Regulations (14 CFR) parts 91, 121, 133, 135).
- 6.8 **Qualified.** A crewmember holds the appropriate airman certificate and ratings as required by the applicable operating part.
- 6.9 **Related Aircraft.** Any two or more aircraft of the same make with either the same or different type certificates that have been demonstrated and determined by the Administrator to have commonality.
- 6.10 **Seat Dependent Tasks.** Maneuvers or procedures using controls that are accessible or operable from only one flightcrew member seat.
- 6.11 **Special Emphasis Area.** A training requirement unique to the aircraft, based on a system, procedure, or maneuver, which requires additional highlighting during training. It may also require additional training time, specialized training devices, or training equipment.
- 6.12 **Specific Flight Characteristics.** A maneuver or procedure with unique handling or performance characteristics that the FSB has determined must be checked.

7. PILOT TYPE RATING

7.1 Type Rating.

The Bombardier Global Express/XRS, Global 6000, Global 5000, and Global 5000 GVFD all share the same pilot type rating, which is designated as BBD-700.

7.2 Common Type Ratings.

Not applicable.

7.3 Military Equivalent Designations.

Military aircraft that qualify for the BBD-700 can be found on the faa.gov website under Licenses and Certificates, Airmen Certification, Online Services, Aircraft Type Rating Designators. This webpage is kept up-to-date and can be found at http://www.faa.gov/licenses_certificates/airmen_certification.

8. RELATED AIRCRAFT

8.1 Related Aircraft on Same TCDS.

The Global Express/XRS, Global 6000, Global 5000, and Global 5000 GVFD are all related.

8.2 Related Aircraft on Different TCDS.

Not applicable.

9. PILOT TRAINING

9.1 Airman Experience.

Airmen receiving Global Express/XRS, Global 6000, Global 5000 and/or Global 5000 GVFD initial type training should have previous experience in part 91 or part 135 air carrier operations and multi-engine turbojet or turboprop aircraft. Pilots without this experience may require additional training.

9.2 Special Emphasis Areas.

Pilots must receive special emphasis on the following areas during initial, transition, differences, upgrade, and/or recurrent ground training:

- a) Flight management system (FMS).
- b) Fuel characteristics and fuel temperature management at high altitudes and cold temperatures.
- c) Wing leading edge contamination and its effect on clean (slats IN/flaps up) stall speed.

- d) Direct current (DC) power system failure modes with emphasis on loss of all DC electrical power, including the relationship and significance of thermal circuit breakers in the Cockpit Circuit Breaker Panel.
- e) Thales HUD (see Appendix 4) or BEVS (see Appendix 5).
- f) Fuel recirculation inhibits.
- g) FMS landing field length.

Pilots should receive special emphasis on the following areas during initial, transition, differences, upgrade, and/or recurrent Systems Integration Training:

- a) Automatic flight control system (AFCS).
- b) Primary flight display (PFD) Flight Director Annunciator (FDA).
- c) FMS.
- d) Electrical Management System (EMS).
- e) Thales HUD (see Appendix 4).
- f) BEVS (see Appendix 5).
- g) Guidance Panel Indications/Selections for autopilot, yaw damper, and coupling.

Pilots must receive special emphasis on the following items during initial, transition, differences, upgrade, and/or recurrent flight training:

- a) Aileron/elevator disconnect (jammed controls in each axis).
- b) PFD, multifunction display (MFD), and engine indication and crew alerting system (EICAS) reversionary modes.
- c) Integrated use of EICAS messages, switch positions, and synoptic pages to determine aircraft system status.
- d) Delayed engine response to full power applications at high altitude (especially high altitude stalls).
- e) Low energy rejected landing from idle thrust.
- f) High altitude (above 45,000 feet) handling characteristics with the autopilot and yaw damper inoperative.
- g) AFCS pitch (PIT) mode characteristics (flight path vs. pitch angle).
- h) Traffic Alert and Collision Avoidance System (TCAS).
- i) Thales HUD (see Appendix 4).
- j) BEVS (see Appendix 5).
- k) Loss of all DC Power.
- l) Stall warning advance.
- m) Loss of Autothrottle during one engine inoperative (OEI) flight.

The FSB also found that early exposure to the AFCS, autothrottles, and FMS is important, especially for pilots with no previous electronic flight instrument system (EFIS), autothrottle, 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 AFCS. In the event of a flight path deviation due to input error or system malfunction, the flightcrew must be able to comfortably transition from automatic to manual operation and back in an orderly fashion consistent with certificate holder's automation philosophy.

9.3 Specific Flight Characteristics.

There are no specific flight characteristics.

9.4 Seat Dependent Tasks.

Pilots must receive training in these seat dependent tasks:

- a) Tiller Usage (left seat); initial, recurrent, upgrade, and transition training.
- b) Thales HUD (left seat/right seat as applicable)¹ (initial, recurrent, upgrade, and transition training.)
- c) BEVS (left/right seat as applicable)² (initial, recurrent, upgrade, and transition training.)

9.5 Regulatory Training Requirements which are Not Applicable to the BD-700-1A10 and BD-700-1A11.

None.

9.6 Flight Simulation Training Devices (FSTD).

- a) Aircraft systems integration training should be completed in a Level 5 FSTD or higher.
- b) Thales HUD (single or dual installation) training must be completed in a Thales HUD system equipped aircraft or a Thales HUD system equipped Level C full flight simulator (FFS), with a daylight visual display or a Level D FFS (see Appendix 4).

9.7 Training Equipment.

There are no specific systems or procedures that are unique to the Global Express/XRS, Global 6000, Global 5000, or Global 5000 GVFD that require specific training equipment.

9.8 Differences Training Between Related Aircraft.

Pilots must receive differences training between the Global Express/XRS, Global 6000, Global 5000, and Global 5000 GVFD if applicable. The level of training is specified in Appendix 3, Differences Tables.

¹ Thales HUD. (Single installation for the left seat is optional for the Global Express and Global 5000 aircraft while single installation for the left seat is standard for the Global Express XRS, Global 6000, and Global 5000 GVFD aircraft. A dual installation is optional for the Global 6000 and Global 5000 GVFD aircraft.) See Appendix 4 for pilot training and checking requirements for operators flying HUD-equipped aircraft.

² BEVS. (Single installation for the left seat is optional for the Global Express and Global 5000 aircraft while single installation for the left seat is standard for the Global Express XRS, Global 6000 and Global 5000 GVFD aircraft. A dual installation is optional for the Global 6000 and Global 5000 GVFD aircraft.) See Appendix 5 for pilot training and checking requirements for operators flying BEVS-equipped aircraft.

10. PILOT CHECKING

10.1 Landing from a No-Flap or Nonstandard Flap Approach.

The probability of flap extension failure on the Global Express/XRS, Global 6000, Global 5000 and Global 5000 GVFD is extremely remote due to system design. Therefore, demonstration of a no-flap approach and landing during pilot certification or a 14 CFR part 61, § 61.58 proficiency check, part 91, § 91.1065 competency check, part 125, § 125.287 competency check, and part 135, § 135.293 competency check is not required.

10.2 Specific Flight Characteristics.

There are no specific flight characteristics.

10.3 Seat Dependent Tasks.

Pilots must be checked in these seat dependent tasks:

- a) Tiller Usage (left seat); initial, recurrent, upgrade, and transition checking.
- b) Thales HUD (left seat/right seat as applicable), if installed. (Initial, recurrent, upgrade, and transition checking) (see Appendix 4 for specific checking requirements.)
- c) BEVS (left seat/right seat as applicable), if installed. (Initial, recurrent, upgrade, and transition training) (see Appendix 5 for specific checking requirements.)

10.4 Other Checking Items.

- a) Proficiency in manual and automatic (including FMS) flight in normal, abnormal, and emergency situations must be demonstrated at each proficiency/competency check by all crewmembers.
- b) The use of manual modes to operate systems such as electrical, hydraulic, pressurization, environmental, etc., and emergency equipment must be demonstrated at each proficiency/competency check by all crewmembers.

10.5 FSTDs.

Thales HUD must be checked in a Thales HUD system equipped Level C FFS with a daylight visual display or a Level D FFS (see Appendix 4.)

10.6 Equipment.

There are no specific systems or procedures that are unique to the Global Express/XRS, Global 6000, Global 5000, or Global 5000 GVFD that require specific equipment.

10.7 Differences Checking Between Related Aircraft.

Pilots must receive differences checking between the Global Express/XRS, Global 6000, Global 5000, and Global 5000 GVFD if applicable. The level of checking is specified in Appendix 3.

11. PILOT CURRENCY

11.1 Pilots must maintain currency in the following:

- a) Thales HUD, if installed. (See Appendix 4 for specific currency requirements.)
- b) BEVS, if installed. (See Appendix 5 for specific currency requirements.)

11.2 Differences Currency Between Related Aircraft.

Pilots must receive differences currency for mixed fleet flying (MFF) of the Global Express/XRS, Global 6000, Global 5000, or Global 5000 GVFD, as appropriate, as follows:

- a) One line segment in each of the relevant airplanes or approved FFS every 90 days.

12. OPERATIONAL SUITABILITY

The BD-700-1A10 was found operationally suitable for operations under parts 91, 125, and 135. The FSB determined operational compliance by conducting an evaluation of a Global Express aircraft serial number 9004 on June 8, 1999. The list of operating rules evaluated is on file at the Long Beach AEG.

The BD-700-1A11 was found to be operationally suitable for operations under parts 91, 125, and 135. The FSB determined operational compliance by conducting an evaluation of a Global 5000 aircraft serial number 9130 during September 13 through 20, 2004. The list of operating rules evaluated is on file at the Long Beach AEG.

13. MISCELLANEOUS

13.1 Flightcrew Sleeping Facilities (Part 135).

Flightcrew Sleeping Facilities are installed via complete interior installation Supplemental Type Certificates (STC). Certain STC installed Flightcrew Sleeping Facilities have been evaluated by the AEG and found to meet the requirements of part 135, FAA Advisory Circular (AC) 121-31, Flightcrew Sleeping Quarters and Rest Facilities, and FAA Order 8900.1. Please contact the Long Beach AEG for additional information regarding approved Flight Crew Sleeping Facilities.

13.2 Forward Observer Seat.

Forward Observer Seats are installed via complete interior installation STCs. Certain STC installed Forward Observer Seats have been evaluated by the AEG and found to meet the requirements of § 135.75(b) and/or § 125.317(b). Please contact the Long Beach AEG for additional information regarding approved Forward Observer Seats.

13.3 Landing Minima Categories.

The Global Express/XRS, Global 6000, Global 5000, and Global 5000 GVFD are considered Category C aircraft for the purpose of determining “straight-in landing weather minima”.

13.4 Normal Landing Flaps.

The Global Express/XRS, Global 6000, Global 5000, and Global 5000 GVFD normal “final landing flap setting” per § 91.126(c) is Flaps 30.

APPENDIX 1. DIFFERENCES LEGEND

Training Differences Legend

Differences Level	Type	Training Method Examples	Conditions
A	Self-Instruction	<ul style="list-style-type: none"> • Operating manual revision (HO) • Flightcrew operating bulletin (HO) 	<ul style="list-style-type: none"> • Crew has already demonstrated understanding on base aircraft (e.g. updated version of engine). • Minor or no procedural changes required. • No safety impact if information is not reviewed or is forgotten (e.g. different engine vibration damping mount). • Once called to attention of crew, the difference is self-evident.
B	Aided Instruction	<ul style="list-style-type: none"> • Audiovisual presentation (AV) • Tutorial computer-based instruction (TCBI) • Stand-up instruction (SU) 	<ul style="list-style-type: none"> • Systems are functionally similar. • Crew understanding required. • Issues need emphasis. • Standard methods of presentation required.
C	Systems Devices	<ul style="list-style-type: none"> • Interactive (full-task) computer-based instruction (ICBI) • Cockpit Procedures Trainers (CPT) • Part task trainers (PTT) • Level 4 or 5 flight training device (FTD 4–5) 	<ul style="list-style-type: none"> • Training can only be accomplished through systems training devices. • Training objectives focus on mastering individual systems, procedures, or tasks versus highly integrated flight operations or “real-time” operations. • Training devices are required to assure attainment or retention of crew skills to accomplish more complex tasks usually related to aircraft systems.
D	Maneuvers Devices	<ul style="list-style-type: none"> • Level 6 or 7 flight training device (FTD 6–7) • Level A or B full flight simulator (FFS A–B) 	<ul style="list-style-type: none"> • Training can only be accomplished in flight maneuver devices in a real-time environment. • Training requires mastery of interrelated skills versus individual skills. • Motion, visual, control loading, and specific environmental conditions may be required.
E	Level C/D FFS or Aircraft	<ul style="list-style-type: none"> • Level C or D full flight simulator (FFS C–D) • Aircraft (ACFT) 	<ul style="list-style-type: none"> • Motion, visual, control loading, audio, and specific environmental conditions are required. • Significant full task differences that require a high fidelity environment. • Usually correlates with significant differences in handling qualities.

Checking Differences Legend

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

APPENDIX 2. MASTER DIFFERENCES REQUIREMENTS (MDR) TABLE

These are the minimum levels of training and checking required, derived from the highest level in the Differences Tables in Appendix 3. Differences levels are arranged as training/checking.

Related Aircraft ↓	Base Aircraft →	Global Express/XRS ¹	Global 5000 ¹	Global 6000	Global 5000 GFVD
Global Express/XRS ¹		Not applicable	A/A	C/C	C/C
Global 5000 ¹		A/A	Not applicable	C/C	C/C
Global 6000		C/C	C/C	Not applicable	A/A
Global 5000 GFVD		C/C	C/C	A/A	Not applicable

¹ Up to batch 2+ aircraft only. Batch 3 information is below.

Related Aircraft ↓	Base Aircraft →	Global Express/XRS (Batch 2+)	Global 5000 (Batch 2+)	Global Express/XRS (Batch 3)	Global 5000 (Batch 3)
Global Express/XRS (Batch 2+)		Not applicable	A/A	Not evaluated	Not evaluated
Global 5000 (Batch 2+)		A/A	Not applicable	Not evaluated	Not evaluated
Global Express/XRS (Batch 3)		B/A	B/A	Not applicable	Not evaluated
Global 5000 (Batch 3)		B/A	B/A	Not evaluated	Not applicable

APPENDIX 3. DIFFERENCES TABLES

Global Express to Global 5000

This Design Differences table, from the Global Express to the Global 5000, was proposed by Bombardier and validated by the Flight Standardization Board (FSB). It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members. This table is for aircraft up to Batch 2+ software.

FROM BASE AIRCRAFT: BD-700-1A10 Global Express	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: BD-700-1A11 Global 5000	ATA 20 Aircraft General	<u>Fuselage</u> Length: 96 ft., 10 in. (29.5 m) Decrease of 32 in. (.81 m) Reduction of two side windows Wingspan: 93 ft., 6 in. (28.65 m) No change Tailspan: 31 ft., 9 in. (9.68 m) No change Height (SATCOM): 25 ft., 8 in. (7.83 m) No change	No	No	A	A

FROM BASE AIRCRAFT: BD-700-1A10 Global Express TO RELATED AIRCRAFT: BD-700-1A11 Global 5000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 20 Aircraft General	<u>Performance</u> Max TO Weight: 92,500 lb. (41,957 kg) Decrease of 8,300 lb. (3,766 kg) Max Landing Weight: 78,600 lb. (35,655 kg) No change Fuel Capacity: 36,187 lb. (16,413 kg) Decrease of 7,363 lb.(3,421 kg)	No	No	A	A
	ATA 20 Aircraft General	<u>Wheel Base</u> Nose to Main Wheels: 40 ft., 2 in. (12.25 m) Decrease of 2 ft., 8 in. (.81 m)	No	No	A	A
	ATA 28 Fuel	Removal of aft fuel tank	No	No	A	A
	ATA 28 Fuel	Fuel recirculation is now an automatic system. Fuel RECIRC switches are inhibited	No	Yes	A	A
	ATA 28 Fuel	Reduction in center tank capacity	No	No	A	A

FROM BASE AIRCRAFT: BD-700-1A10 Global Express TO RELATED AIRCRAFT: BD-700-1A11 Global 5000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 28 Fuel	Minor EICAS/Synoptic page changes	No	No	A	A
	ATA 28 Fuel	Fuel control panel, deletion of switches and switch labels changed	No	Yes	A	A
	ATA 28 Fuel	Refueling panel, deletion of switches and switch labels changed	No	No	A	A
	ATA 31 Indicating/Recording Systems	New fuel synoptic page	No	No	A	A

This Maneuver Differences table, from the Global Express to the Global 5000, was proposed by Bombardier and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members. This table is for aircraft up to Batch 2+ software.

FROM BASE AIRCRAFT: BD-700-1A10 Global Express TO RELATED AIRCRAFT: BD-700-1A11 Global 5000	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 9 Towing and Taxi	Turning radius decreases from 68 ft. (20.9 m) to 64 ft., 1 in. (19.5 m)	No	No	A	A

Global 5000 to Global Express

This Design Differences table, from the Global 5000 to the Global Express, was proposed by Bombardier and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members. This table is for aircraft up to Batch 2+ software.

FROM BASE AIRCRAFT: BD-700-1A11 Global 5000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: BD-700-1A10 Global Express	ATA 20 Aircraft General	<u>Fuselage</u> Length: 99 ft., 5 in. (30.30 m) Increase of 32 in. (.81 m) Addition of two side windows Wingspan: 93 ft., 6 in. (28.65 m) No change Tailspan: 31ft., 9 in. (9.68 m) No change Height (SATCOM): 25 ft., 8 in. (7.83 m) No change	No	No	A	A

FROM BASE AIRCRAFT: BD-700-1A11 Global 5000 TO RELATED AIRCRAFT: BD-700-1A10 Global Express	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 20 Aircraft General	<u>Performance</u> Max TO Weight: 96,000 lb. (43,546 kg) Increase of 8,300 lb. (3,766 kg) Max Landing Weight: 78,600 lb. (35,655 kg) No change Fuel Capacity: 43,550 lb. (19,750 kg) Increase of 7,350 lb.(3,421 kg)	No	No	A	A
	ATA 20 Aircraft General	<u>Wheel Base</u> Nose to Main Wheels: 42 ft., 10 in. (13.1 m) Increase of 2 ft., 8 in. (.81 m)	No	No	A	A
	ATA 28 Fuel	Addition of aft fuel tank	No	No	A	A
	ATA 28 Fuel	Fuel recirculation is now a manual system. Fuel RECIRC switches have On/Off functions	No	Yes	A	A
	ATA 28 Fuel	Increase in center tank capacity	No	No	A	A

FROM BASE AIRCRAFT: BD-700-1A11 Global 5000 TO RELATED AIRCRAFT: BD-700-1A10 Global Express	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 28 Fuel	Minor EICAS/Synoptic page changes	No	No	A	A
	ATA 28 Fuel	Fuel control panel, addition of switches and switch labels changed	No	Yes	A	A
	ATA 28 Fuel	Refueling panel, addition of switches and switch labels changed	No	No	A	A
	ATA 31 Indicating/Recording Systems	New fuel synoptic page	No	No	A	A

This Maneuver Differences table, from the Global 5000 to the Global Express, was proposed by Bombardier and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members. This table is for aircraft up to Batch 2+ software.

FROM BASE AIRCRAFT: BD-700-1A10 Global 5000 TO RELATED AIRCRAFT: BD-700-1A11 Global Express	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 9 Towing and Taxi	Turning radius increases from 64.1 ft. (19.5 m) to 68 ft. (20.76 m)	No	No	A	A

APPENDIX 4. THALES HEAD-UP DISPLAY (HUD) SYSTEM

1. BACKGROUND

The Flight Standardization Board (FSB) participated in an evaluation of the Thales Head-Up Display System (HUD) during its development in the fall of 2004 using a Global Express aircraft and a full flight simulator (FFS). The FSB conducted certification flight tests, along with the New York Aircraft Certification Office (NYACO), in a Global Express aircraft in Wichita, Kansas. Flight testing consisted of approximately 40 HUD approaches at several different airports, using CAT I procedures, during day, night, visual meteorological conditions (VMC), and instrument meteorological conditions (IMC).

The FSB also evaluated the proposed Airplane Flight Manual (AFM) Supplement for HUD Operations.

2. PILOT TYPE RATING

Not Applicable.

3. RELATED AIRCRAFT

The Thales HUD is standard equipment on the Global Express XRS aircraft but can also be installed on the Global Express and Global 5000 aircraft. The Thales HUD System installations on Global Express/XRS and Global 5000 airplanes have been found to be functionally equivalent. If Thales HUD training and checking requirements are accomplished in one aircraft, training and checking need not be repeated in the other.

4. PILOT TRAINING

For single HUD installation, the HUD training focuses principally upon training events flown in the left seat by the pilot flying (PF). Training for the pilot monitoring (PM) is also required for any procedural differences when the PF is heads-up (compared to heads-down).

For dual HUD installation, training events can be flown in the left or right seat as PF. Training for the PM is also required for any procedural differences when the PF is heads-up (compared to heads-down).

HUD INITIAL GROUND TRAINING

Pilots training to serve as PF during HUD operations should receive a minimum of 2 hours of ground school training in the operation and use of the HUD.

The initial ground training program should include the following elements:

- a) Classroom instruction covering HUD operational concepts, crew duties and responsibilities, and operational procedures including preflight, normal, and abnormal operations, EICAS messages, use of quick reference handbook (QRH) and checklists, miscompare, and failure flags.
- b) Classroom instruction or computer-based training (CBT) on the HUD symbology set and its interrelationship with airplane aerodynamics, inertial factors, environmental conditions, and comparison to primary flight display (PFD).
- c) A HUD pilot training manual or equivalent material in the Flightcrew Operations Manual (FCOM), which explains the limitations, all modes of operation, clear descriptions of HUD symbology, including limit conditions and failures, and incorporating a crew procedures guide clearly delineating PF and PM duties, responsibilities, and procedural callouts and responses during all phases of flight during which HUD operations are anticipated.

The FSB recommends special emphasis ground training in the following areas:

- a) Crew coordination.
- b) Crew briefings and callouts.
- c) Duties of PF and PM.
- d) Engine indicating and crew alerting system (EICAS) messages and use of QRH and checklists applicable to HUD.

HUD INITIAL FLIGHT TRAINING

Pilots training to serve as PF during HUD operations should receive a minimum of 2 hours of flight training in the operation and use of the HUD. A pilot who progresses through initial or transition flight training in a Global Express/5000 aircraft and satisfactorily completes HUD system curriculum segments, is recommended by an instructor, and completes a HUD proficiency check by a person authorized by the Administrator need not complete the recommended 2 hours of flight training.

For single HUD installation, flight training must be conducted from the left seat. For dual HUD installations, flight training may be conducted from either seat. Flight training may be conducted in a Thales HUD system equipped aircraft or a Thales HUD system equipped Level C FFS with a daylight visual display or a Level D FFS. FFS approaches, utilizing the HUD, should begin no closer than the final approach fix (FAF) for instrument approaches, and should begin no closer than approximately 1,000 feet above ground level (AGL) (3–4 nautical miles (NM)) to the runway threshold for visual approaches.

Unless integrated with initial type rating training, flight training dedicated to HUD familiarization and proficiency is in addition to other required training elements.

The following HUD flight training program is generic in nature and should be considered as a guide only:

- a) Ground Operations:
 - 1) Deployment of HUD and stowage.
 - 2) Taxi using HUD under various lighting and visibility conditions.
- b) Airwork:
 - 1) Straight and level flight, accelerations, and decelerations.
 - 2) Normal and steep turns, climbs, and descents.
 - 3) Wind effects on HUD display.
 - 4) Stall prevention and recovery
 - 5) Recovery from unusual attitudes.
- c) Visual Takeoffs, Approaches, and Landings:
 - 1) Crosswind takeoff and landing.
 - 2) Visual approaches to runways at night with minimal lighting (“black hole” approaches) and use of Flight Path Vector (FPV) to achieve desired descent angle.
 - 3) Engine failure on takeoff.
 - 4) One engine inoperative (OEI) landing.
 - 5) OEI go-around.
- d) Instrument Approaches:
 - 1) Approaches to the lowest authorized minima, including an approach and landing with OEI.
 - 2) Missed approach OEI.
 - 3) Non-precision and circling approaches (if applicable).
- e) Abnormal/Emergency Operations: (as appropriate)
 - 1) Windshear escape.
 - 2) Enhanced ground proximity warning system (EGPWS) escape.
 - 3) Traffic Alert and Collision Avoidance System (TCAS) Resolution Advisory (RA).
 - 4) HUD failure on approach.
 - 5) Approaches with the aircraft in a non-normal slat/flap configuration.

The FSB recommends special emphasis flight training in the following areas:

- a) Approaches to “black hole” airports.
- b) Use of the flare symbol as a cue (not as guidance).
- c) Recovery from unusual attitudes.
- d) TCAS RA.
- e) Crosschecking from HUD to cockpit displays, including EICAS and other cockpit indications.

HUD RECURRENT GROUND TRAINING

Selected HUD related ground training subjects as outlined in initial ground training above should be reviewed on a recurrent basis.

5. PILOT CHECKING

Pilots training to serve as PF during HUD operations must be administered a proficiency check conducted in a Level C FFS with a daylight visual display, or level D FFS, or on a Thales HUD System equipped aircraft. This proficiency check may be taken in conjunction with a pilot proficiency check conducted in accordance with part 61 or 135 or may be administered as a separate test.

Maneuvers to be evaluated during the HUD proficiency check include, as a minimum:

- a) One takeoff.
- b) One departure procedure.
- c) One instrument approach procedure (IAP).
- d) One landing.

Pilots should also be checked on PM duties during HUD approaches and emergencies.

HUD RECURRENT CHECKING

At least annually, in conjunction with a pilot-in-command (PIC) proficiency check required by part 61 or 135, a PIC must demonstrate proficiency using the Thales HUD system by satisfactorily performing the maneuvers listed above.

During recurrent part 135 competency checks, second in commands (SIC) serving as PF during HUD operations should demonstrate proficiency using the HUD by satisfactorily performing the maneuvers listed above.

During recurrent part 135 competency checks, SICs serving as PM during HUD operations should be evaluated on Crew Resource Management (CRM) responsibilities and procedures when the PF is conducting HUD operations.

6. PILOT CURRENCY

Pilots should have completed at least three takeoffs, approaches, and landings using the HUD in the Global Express/XRS/5000 or have completed three takeoffs, approaches, and landings as the PF using the Thales HUD system in a Level C FFS with day and night visual displays or Level D FFS within the previous 90 days before acting as the PF using the HUD in revenue operations.

7. OPERATIONAL SUITABILITY

The Thales HUD, as well as the associated AFM change, was found to be operationally suitable for all phases of flight, including CAT I and CAT II operations when authorized.

APPENDIX 5. BOMBARDIER ENHANCED FLIGHT VISION SYSTEM

The content of this appendix has been removed. Refer to part 61, § 61.66 for training, recency of experience, and proficiency requirements for enhanced flight vision system (EFVS) operations.

EFVS installed on this aircraft has been deemed operationally suitable for EFVS operations to 100 feet above touchdown zone elevation (TDZE) only. Compliance in accordance with part 91, § 91.176(b) has been validated.

APPENDIX 6. GLOBAL EXPRESS/XRS TO GLOBAL 6000 AND GLOBAL 5000 TO GLOBAL 5000 GVFD

1. BACKGROUND

The Global Express Flight Standardization Board (FSB) participated in an evaluation of the training, checking, and currency differences that have occurred by the introduction of the Global Vision Flight Deck (GVFD). Additionally, the FSB was tasked to determine the appropriate type rating for the BD-700-1A10 GVFD known as the “Global 6000”.

For clarification, the FSB evaluation involved the following:

- a) The differences between the BD-700-1A10 “Global Express/XRS” aircraft and the BD-700-1A10 GVFD known as the “Global 6000”.
- b) The differences between the BD-700-1A11 “Global 5000” aircraft and the BD-700-1A11 GVFD also known as the “Global 5000 GVFD”.
- c) The initial Pilot Type Rating of the Global 6000/Global 5000 GVFD.

2. PILOT TYPE RATING

The FSB determined that the same aircraft type rating designation “BD-700” is appropriate between the existing Global Express/XRS/5000 and the Global 6000/Global 5000 GVFD variations. Differences training should be accomplished in a Level 5 FTD or higher FSTD.

3. RELATED AIRCRAFT

The FSB determined that the Global Express/XRS, Global 6000, Global 5000, and Global 5000 GVFD are all related.

4. PILOT TRAINING

Differences training should be accomplished in a Level 5 flight training device (FTD) or higher flight simulation training device (FSTD).

Due to the flightcrew differences, the FSB recommends special emphasis training in the following areas:

- a) Flight deck display layout (Airport Facility Directory (AFD)/display unit (DU)) and functionality.
- b) Control panels – Control Panel (CTP), Audio Control Panel (ACP), Communication, Navigation, and Surveillance (CNS), multifunction keypad (MKP), and Cursor Control Panel (CCP).
- c) Emergency Descent Button (EDM) and functionality.
- d) Under speed protection.

- e) Nav to Nav transfer, Global Positioning System (GPS)/Wide Area Augmentation System (WAAS)/Localizer Performance with Vertical Guidance (LPV)/Required Navigation Performance (RNP)/Performance-Based Navigation (PBN), and instrument approach procedures (IAP).
- f) Direct Current (DC) power failure modes with emphasis on loss of all DC electrical power.
- g) Automatic flight control system (AFCS) modes, autopilot (A/P) all engines operating (AEO) in all phases of flight, including one engine inoperative (OEI) in all phases of flight, including OEI go-around, primary flight display (PFD), Flight Director Annunciator (FDA), and Flight Mode Annunciator (FMA) indications.
- h) A/P response during windshear escape guidance.
- i) Terrain Awareness and Warning System (TAWS) and enhanced ground proximity warning system (EGPWS).
- j) Use of Enhanced Vision System (EVS) and Synthetic Vision System (SVS) is for situational awareness only. EVS as described in this paragraph provides infrared (IR) imagery only on a multifunction display (MFD) and is not suitable for operations prescribed in part 91, § 91.176.
- k) Caution and warning messages on the engine indication and crew alerting system (EICAS) and horizontal situation indicator (HSI) and associated human factors issues.
- l) Use of flight management system (FMS) including takeoff preparation and Electrical Management System (EMS).
- m) Crew Resource Management (CRM) with regards to the new functionalities.

After completion of the differences training referred to in paragraph 2, it is recommended that the Line-Observation Program training be completed as soon as possible with a line check pilot to consolidate training. It is further recommended that a minimum of two flights be flown, one as the pilot flying (PF) and one as the pilot monitoring (PM).

When operating more than one variation, recurrent training should be alternated between the Global Express/XRS/Global 5000 and Global 6000/Global 5000 GVFD, addressing the differences of all applicable variations on each occasion.

5. PILOT CHECKING

Differences should be checked at Level C in a Level 5 FTD or higher FSTD. Due to the flightcrew differences, the FSB recommends special emphasis checking in the following areas:

- a) Flight deck display layout (AFD/DU) and functionality.
- b) Control panels – CTP, ACP, RTSA, CNS, MKP, and CCP.
- c) EDM and functionality.
- d) Under speed protection.
- e) Nav to Nav transfer, GPS/WAAS/LPV/RNP/PBN, and IAPs.
- f) DC power failure modes with emphasis on loss of all DC electrical power.
- g) AFCS modes, A/P AEO in all phases of flight including OEI in all phases of flight, including OEI go-around, PFD, FDA, and FMA indications.
- h) A/P response during windshear escape guidance.

- i) TAWS and EGPWS.
- j) Use of EVS and SVS for situational awareness only. EVS as described in this paragraph provides IR imagery only on an MFD and is not suitable for operations prescribed by §§ 91.175 and 91.176.
- k) Caution and warning messages on the EICAS and HIS and associated human factors issues.
- l) Use of FMS, including takeoff preparation and EMS.
- m) CRM with regards to the new functionalities.

When operating more than one variation, recurrent checking should be alternated between the Global Express/XRS/Global 5000 and Global 6000/Global 5000 GVFD, addressing the differences of all applicable variations on each occasion.

6. PILOT CURRENCY

When operating both the Global Express/XRS/Global 5000 and Global 6000/5000 GVFD, the FSB recommends that flightcrews perform at least one flight as PF or PM in the “Global Express/XRS or Global 5000” variation and at least one flight in the “Global 6000 or Global 5000 GVFD” within the currency period (90 days).

This currency requirement between variations should address the following differences:

- a) Takeoff preparation and takeoff.
- b) Enroute use of the FMS.
- c) IAPs.

7. OPERATIONAL SUITABILITY

The Global 6000 and Global 5000 GVFD, including GVFD Software Version 4.3.1 as well as the associated Airplane Flight Manual (AFM), was found to be operationally suitable.

APPENDIX 7. HONEYWELL BATCH 2+ TO BATCH 3 SOFTWARE UPGRADE

1. BACKGROUND

In 2011, Bombardier introduced the Batch 3 software upgrade to the Global Express/XRS and Global 5000 Honeywell Avionics aircraft. Batch 3 adds improvements to the Integrated Avionics Computers (IAC) that affect the flight management systems (FMS), Flight Guidance Computers (FGC), and displays. Updated Global Navigation Satellite System (GNSS) receivers with Satellite-Based Augmentation System (SBAS) that provide localizer performance with vertical guidance (LPV) approach capability, and Future Air Navigation System 1/A (FANS 1/A) capability (Automatic Dependent Surveillance-Contract (ADS-C) and Controller-Pilot Data Link Communication (CPDLC)) are available options.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

The Batch 3 software upgrade on Global Express/XRS and Global 5000 airplanes has been found to be functionally equivalent. If Batch 3 software training and checking requirements are accomplished in one aircraft, Batch 3 software training and checking need not be repeated in the other.

4. PILOT TRAINING

Pilots transitioning to Batch 3 software should be trained on the differences using any one of the following level “B” differences training media: audiovisual presentation (AV), tutorial computer-based instruction (TCBI), or stand-up instruction.

The differences training should include the following elements:

- a) Flightcrews should be provided with and review the Pilot Training Guide (PTG), Operating Manual Revision (OMR), Flightcrew Operating Manual (FCOM), quick reference handbook (QRH), and flight management system (FMS) pilot guide that detail the differences between Batch 2+ and Batch 3 for self-study prior to undertaking the Bombardier Aircraft Training Center (BATC) eLearning.
- b) Flightcrews should clearly understand flight guidance panel (FGP) selections and primary flight display (PFD) annunciations while conducting FMS-based approaches using lateral navigation (LNAV), VPTH, Vertical Glide Path (VGP), and LPV (optional) functions.

- c) CAUTION: The proper setting of the altitude pre-selector during approach operations should be clearly understood. The safety mitigations for conducting a go-around with the altitude pre-selector set to landing elevation should be emphasized. This training area is of particular importance for operators flying mixed Batch 2+ and Batch 3 aircraft configurations.
- d) Bombardier and/or operator developed standard operating procedures (SOP) related to Crew Resource Management (CRM) and human factors in the use of FANS CPDLC (optional), including division of duties, cross-confirmation, and aircraft flight path changes, etc.

5. PILOT CHECKING

Not applicable.

6. PILOT CURRENCY

There are no currency requirements for the Batch 2+ to Batch 3 software differences. In the event that flightcrews will be required to operate a mixed fleet of aircraft with Batch 2+ and Batch 3 software, currency should be maintained through self-review of the differences.

7. OPERATIONAL SUITABILITY

The Honeywell Batch 3 software upgrade, as well as the associated Airplane Flight Manual (AFM) change, was found to be operationally suitable.

APPENDIX 8. GLOBAL VISION FLIGHT DECK (GVFD) SOFTWARE UPGRADE VERSION 4.3.1 (VERSION 3) TO 4.5.8 (VERSION 4.5)

1. BACKGROUND

In 2012, Bombardier introduced the Rockwell Collins Fusion based Global Vision Flight Deck (GVFD) avionics suite into the BD-700-1A10 “Global Express/XRS” and BD-700-1A11 “Global 5000” aircraft. A BD-700-1A10 aircraft with GVFD is marketed as a “Global 6000” while a BD-700-1A11 aircraft with GVFD is marketed as a “Global 5000 GVFD”.

GVFD Software Version 4.5.8 (marketed as Version 4.5) is the first major software upgrade to the GVFD avionics suite, which include an electronic checklist (ECL) function, vertical situation display (VSD), flight management system (FMS) takeoff and landing data (TOLD) performance, FMS speed control, a third FMS, and Required Navigation Performance Authorization Required Approach (RNP AR APCH) capability.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

The GVFD Version 4.5.8 software upgrade on Global 6000 and Global 5000 GVFD airplanes has been found to be functionally equivalent. If Version 4.5.8 software training and checking requirements are accomplished in one aircraft, Version 4.5.8 software training and checking need not be repeated in the other.

4. PILOT TRAINING

Perquisites. - flightcrew members upgrading to software Version 4.5.8 (Version 4.5) must have previously been trained and found qualified on the software upgrade Version 4.3.1 (Version 3).

Pilots transitioning to Version 4.5.8 software should be trained on the differences using any one of the following Level “C” differences training media: Interactive (full-task) computer-based instruction (ICBI), Cockpit Procedures Trainers (CPT), part task trainers (PTT), or a Level 4 or 5 flight training device (FTD 4–5). It is expected that, at some time in the future, all GVFD aircraft will be updated to software Version 4.5.8 (or a later version), at which point this differences training will have been integrated into the full initial course, and integrated into the differences courses to transition from Global aircraft equipped with Honeywell avionics to aircraft equipped with Rockwell Collins avionics, making this differences course redundant.

The differences training should include the following elements:

- a) Standard operating procedures (SOP) and crew coordination using the ECL.
- b) Use of the ECL backup (paper, Integrated Flight Information System (IFIS), Electronic Flight Bag (EFB), as applicable).
- c) FMS TOLD and manual FMS TOLD entries.

Flex TO RNP AR APCH specific training is covered in Appendix 9, Required Navigation Performance Authorization Required (RNP AR) 0.3.

5. PILOT CHECKING

Not applicable, Level A.

RNP AR APCH specific checking is covered in Appendix 9.

6. PILOT CURRENCY

There are no currency requirements for the GVFD Version 4.3.1 to Version 4.5.8 software differences. In the event that flightcrews will be required to operate a mixed fleet of GVFD aircraft with Version 4.3.1 and Version 4.5.8 software, currency should be maintained through self-review of the differences.

RNP AR APCH specific currency is covered in Appendix 9.

7. OPERATIONAL SUITABILITY

The GVFD Version 4.3.1 to Version 4.5.8 software upgrade, as well as the associated Airplane Flight Manual (AFM) change, was found to be operationally suitable.

APPENDIX 9. REQUIRED NAVIGATION PERFORMANCE AUTHORIZATION REQUIRED (RNP AR) 0.3

1. BACKGROUND

As a prerequisite to Required Navigation Performance Authorization Required (RNP AR) training, checking, and currency requirements as defined in this appendix, pilots must have met the requirements of Appendix 8 for qualification in Global 6000 or Global 5000 Global Vision Flight Deck (GVFD) aircraft.

This appendix only applies to Global 6000 and Global 5000 GVFD aircraft that have the avionics upgrades installed as defined in Appendix 8 and has RNP AR avionics capability for which pilot training, checking, and currency is sought.

NOTE: Completion of RNP AR training and checking does not constitute approval to conduct RNP AR operations. Operators should reference FAA Advisory Circular (AC) 90-101A, Approval Guidance for RNP Procedures with AR, for RNP AR application preparation and processing.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

RNP AR capability installed on Global 6000 and Global 5000 GVFD airplanes has been found to be functionally equivalent. If training, checking, and currency requirements are accomplished in one aircraft, RNP AR training, checking, and currency need not be repeated in the other.

4. PILOT TRAINING

In conducting RNP AR approaches, specified duties and procedures are assigned to both the pilot flying (PF) and pilot monitoring (PM). Therefore, the requirement for initial and recurrent training as defined below is applicable to both pilot in command (PIC) and second in command (SIC).

RNP AR INITIAL TRAINING

For Global 6000 or Global 5000 GVFD aircraft with RNP AR approach capability, training programs must fully comply with the requirements of AC 90-101A.

Initial ground and flight training must encompass all elements applicable to the Global 6000 or Global 5000 GVFD as defined in AC 90-101A, Appendix 4, Operational Considerations, and Appendix 5, Training.

Initial flight training in a qualified flight simulation training device (FSTD) or Global 6000 or Global 5000 GVFD aircraft¹ must include:

- a) Four RNP AR² approaches: two as PF and two as PM.
- b) Two of the four RNP AR approaches must be flown to the decision altitude (DA).
- c) Two of the four RNP AR approaches must be flown to an RNP missed approach.
- d) One of the four RNP AR approaches must include an interrupt with vectors to resume the approach.
- e) One of the four RNP AR approaches must include a hold at an initial approach fix (IAF) or transition fix.

RNP AR RECURRENT TRAINING

Recurrent ground training must include, as a minimum, a review of “Pilot Procedures” and “Abnormal/Failures” as defined in AC 90-101A, Appendix 5.

Recurrent flight training in a qualified FSTD or Global 6000 or Global 5000 GVFD aircraft must include:

- a) Two RNP AR³ approaches: one as PF and one as PM.
- b) One of the two RNP AR approaches must be flown to the DA.
- c) One of the two RNP AR approaches must be flown to an RNP published missed approach.
- d) One of the two RNP AR approaches must include an interrupt with vectors to resume the approach or a hold at an IAF or transition fix.

NOTE: An RNP AR procedure may be substituted for any precision or non-precision approach in a recurrent training program required under part 135, § 135.351.

SPECIAL EMPHASIS TRAINING

The FSB has determined that the following items should receive special emphasis in an approved RNP AR training program:

- a) Required equipment for RNP AR approaches (Minimum Equipment List (MEL) review and in-flight equipment failure).
- b) Missed approach procedures on radius to fix (RF) legs.
- c) Manually flown approaches and missed approaches.
- d) Temperature compensation.

¹ Flight training when conducted in the aircraft must be in VMC.

² Two of the four approaches must have RF legs.

³ One of the two approaches must have RF legs.

5. PILOT CHECKING

In conducting RNP AR approaches, specified duties and procedures are assigned to the PF and PM. Therefore, the requirement for initial and recurrent checking is applicable to both PIC and SIC.

INITIAL AND RECURRENT CHECKING REQUIREMENT:

RNP AR checking in a qualified FSTD or Global 6000 or Global 5000 GVFD aircraft must include:

- a) Two RNP AR¹ approaches: (flown as PF).
- b) One takeoff with an RNP AR approach flown to an RNP published missed approach and a second RNP AR approach flown to a landing.

INSTRUMENT COMPETENCY/PROFICIENCY CHECK REQUIREMENTS UNDER §§ 135.293, 135.297 or PIC PROFICIENCY CHECK UNDER PART 61, § 61.58

For PICs qualified and authorized for RNP AR approaches, at least one RNP AR approach with RF legs must be demonstrated during a § 135.293(b) Competency Check or § 135.297 Instrument Proficiency Check or during a PIC Proficiency Check under § 61.58. Additionally, the PM during the check must be RNP AR current and qualified in accordance with this appendix.

NOTE: An RNP AR approach may be substituted for any required precision or non-precision approach on any competency or proficiency check required under parts 61 or 135.

6. PILOT CURRENCY

To maintain currency in RNP AR operations, a PIC must have accomplished at least one RNP AR approach to either a missed approach or landing within the preceding 6 months. Additionally, the PM (SIC) used in meeting this currency requirement must be RNP AR current and qualified as described this appendix.

The RNP AR approach must have been accomplished in either an appropriately qualified FSTD or a Global 6000 or Global 5000 GVFD aircraft.

Any checking under parts 61 or 135 that requires a demonstration of RNP AR approach competency that was accomplished within the preceding 6 months satisfies this currency requirement.

If RNP AR approach currency is lost, currency may be reestablished by completing the RNP AR recurrent training and checking elements defined in this appendix.

¹ One of the approaches must have RF legs.

7. OPERATIONAL SUITABILITY

RNP AR capability, as well as the associated Airplane Flight Manual (AFM) change, was found to be operationally suitable.

APPENDIX 10. GLOBAL VISION FLIGHT DECK (GVFD) SOFTWARE UPGRADE VERSION 4.5.8 (VERSION 4.5) TO 5.1.3 (VERSION 5.0)

1. BACKGROUND

In 2012, Bombardier introduced the Rockwell Collins Fusion based Global Vision Flight Deck (GVFD) avionics suite into the BD-700-1A10 “Global Express” and BD-700-1A11 “Global 5000” aircraft. A BD-700-1A10 aircraft with GVFD is marketed as a “Global 6000” while a BD-700-1A11 aircraft with GVFD is marketed as a “Global 5000 GVFD”.

GVFD software Version 5.1.3 (marketed as Version 5.0) is the second major software upgrade to the GVFD avionics suite, which incorporates new functions and upgrades to the following systems: Electronic Displays, Navigation and Communications, and the flight management system (FMS).

A small number of Global 6000 and Global 5000 GVFD aircraft may have Version 4.5.9 versus Version 4.5.8 software (both marketed as Version 4.5). The Flight Standardization Board (FSB) only evaluated the GVFD Version 4.5.8 to Version 5.1.3 software upgrade.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

The GVFD Version 5.1.3 software upgrade on Global 6000 and Global 5000 GVFD airplanes has been found to be functionally equivalent. If Version 5.1.3 software training and checking requirements are accomplished in one aircraft, Version 5.1.3 software training and checking need not be repeated in the other. It is expected that, at some time in the future, all GVFD aircraft will be updated to software version 5.1.3 (or a later version), at which point this differences training will have been integrated into the full initial course and integrated into the differences courses to transition from Global aircraft equipped with Honeywell avionics to aircraft equipped with Rockwell Collins avionics, making this differences course redundant.

4. PILOT TRAINING

Perquisites - pilots upgrading to the GVFD software 4.5.8 (4.5) must have previously been trained and found qualified on the GVFD software Version 4.3.1 (Version 3).

Pilots transitioning from GVFD Version 4.5.8 to Version 5.1.3 software should be trained on the differences using any one of the following Level “B” differences training media: audiovisual presentation (AV), tutorial computer-based instruction (TCBI), or stand-up instruction.

The differences training should include the following elements:

- a) Electronic Displays:
 - 1) Altimeter Setting Memory.
 - 2) New Crew Alert System (CAS) Caution/Advisory Messages.
 - 3) Graphical Weather Annunciation.
 - 4) Synthetic Vision System (SVS) Changes:
 - a. Halos.
 - b. Centerline Extensions.
 - c. MISCOMPARE.

- b) Navigation and Communication:
 - 1) Define Name Field for high frequency (HF), very high frequency (VHF), navigation (NAV), and automatic direction finder (ADF) Radios.
 - 2) Terrain Awareness and Warning System (TAWS):
 - a. Peaks Reductions.
 - b. Display Changes.
 - 3) Vertical situation display (VSD) Proportional Runway Length.
 - 4) Surface Management System:
 - a. Operation.
 - b. Takeoff Alerts (including “Not a Runway”, “Short Runway”, and “RUNWAY MISCOMPARE”).
 - c. Landing Alerts (including “Not a Runway” and “Short Runway”).
 - d. Warnings, Annunciations, and Alerts.
 - e. CAS Messages.
 - f. Airplane Flight Manual (AFM) Supplements and Limitations.

- c) FMS Upgrades:
 - 1) Predictive Step Climbs and Descents.
 - 2) FMS Speed Target/Manual Speed Target Limitations and Use.
 - 3) Optimum V_1/V_r Calculations.
 - 4) Out/6 Overspeed Function:
 - a. FMS Calculations.
 - b. Manual AFM Supplement Calculations.
 - c. All engines operating (AEO)/one engine inoperative (OEI) Procedures and Pitch Reductions.
 - 5) Balanced Field Length Function for Out/0 Configuration:
 - a. FMS Calculations.
 - b. Manual AFM Supplement Calculations.
 - c. AFM Supplements and Limitations (including Future Air Navigation System (FANS) Controller-Pilot Data Link Communication (CPDLC), Holding, localizer performance without vertical guidance (LPV) Approach, and Temperature Compensation).
 - 6) AFM Supplements and Limitations (including FANS CPDLC, Holding, LPV Approach, and Temperature Compensation).
 - 7) Nav to Nav Transfer Updates.

- 8) New primary flight display (PFD)/multifunction display(MFD)/FMS/Head-Up Display (HUD) Annunciations.
- d) Flightcrew Operating Manual (FCOM), quick reference handbook (QRH), and AFM Supplements and Limitations changes.

5. PILOT CHECKING

Pilots transitioning from GVFD Version 4.5.8 to Version 5.1.3 software should be checked on the differences using any one of the following Level “B” differences checking methods: oral or written exam or TCBI.

6. PILOT CURRENCY

There are no currency requirements for the GVFD Version 4.5.8 to Version 5.1.3 software differences. In the event that flightcrews will be required to operate a mixed fleet of GVFD aircraft with Version 4.5.8 and Version 5.1.3 software, currency should be maintained through self-review of the differences.

7. OPERATIONAL SUITABILITY

The GVFD Version 4.5.8 to Version 5.1.3 software upgrade, as well as the associated AFM change, was found to be operationally suitable.

APPENDIX 11. GLOBAL 5000/6000 STEEP APPROACH OPERATIONS

BACKGROUND

A Flight Standardization Board (FSB) was convened on June 20, 2013, to evaluate operational suitability and to determine training, checking, and currency requirements for conducting steep approaches in the Global 5000/6000 aircraft. FSB member training and flying took place at the Bombardier Aerospace facility in Wichita, Kansas. Certification flight testing had been completed prior to the FSB.

Steep approaches in the Global 5000/6000 are defined as those glide paths greater than 4.5 ° and less than or equal to 5.5 °. The Global 5000/6000, as currently configured, is capable of flying steep approaches without modifications to the airframe or changes to the avionics system or flight management system (FMS). The enhanced ground proximity system (EGPWS) database is able to recognize those airports that support steep approach operations and automatically apply an additional 500 feet per minute (FPM) descent rate to the “SINK RATE” alert and 200 FPM to the “PULL-UP” warning alert. Steep approaches must be flown with the spoilers - FULL.

Steep approaches were conducted during day conditions using 5.5 ° approach angles. Two-engine and single-engine steep approaches were flown, terminating either with a landing or execution of a missed approach or bailed landing procedure. Although steep approaches in the Global 5000/6000 must be conducted with both engines operative, the FSB evaluated piloting skills required to perform a single engine extraction inside the final approach fix (FAF).

OPERATIONAL SUITABILITY ASSESSMENT

The FSB has determined that, when coupled to the autopilot and autothrottles, the conduct of steep approaches require no higher piloting skill level than that of normal (3 °) approaches. Although the sight picture at flare is definitely steeper, a pilot is able to easily adapt to the slight increase in flare rate, or slight increase in flare altitude, as the aircraft is placed in the proper landing attitude. The FSB determined that the use of the Head-Up Display (HUD) is advantageous in executing steep approaches but not mandatory. Use of the autopilot and autothrottles from the FAF to the minimum use height of 250 feet above touchdown is mandatory during steep approaches in the Global 5000/6000. Therefore, competence in conducting steep approaches can be achieved through ground training and by flight training.

PREREQUISITES FOR STEEP APPROACH TRAINING

Prior to receiving steep approach training in the Global 5000/6000 or unless steep approach training is integrated within the initial or recurrent Global 5000/6000 training and the steep approach training is conducted immediately preceding the competency/proficiency check, the pilot must have been previously qualified in the Global 5000/6000 aircraft.

STEEP APPROACH TRAINING REQUIREMENTS

Ground Training

Ground training must consist of training in the following areas and is appropriate to any flightcrew member position:

- 1) AFM Supplement review to include Limitations, Procedures, Weight and Balance (W&B), Performance, Approach and Landing configuration, Landing Flare, Stall Warning, and EPGWS Mode 1 operations.
- 2) Stages of the steep approach to include stabilized approach concept, (early configuration, including proper airspeed, flap settings, speedbrakes, and landing gear), glide slope capture, flare attitude, and appropriate change in pitch rate.
- 3) Comparison of the steep approach sight picture to that of 3 °(normal) approach.
- 4) Pilot techniques to include early configuration, avoidance of abrupt control inputs, ground rush illusions.
- 5) Identification of airports with steep approaches to include the differences between landing distance data for London City Airport and other airports with steep approaches.

Flight Training

Flight training is required for the Global 5000/6000 steep approaches assuming the ground training described above has been completed.

NOTE 1: If steep approach training is desired, it is possible to program the Global FMS to fly a steep approach to any runway in the navigation database for which visual approach is available. Unless the airport has a designated steep approach in the FMS database, EGPWS alerts (“SINK RATE”, PULL-UP) will be heard in the final phase of the approach and landing (below approximately 400 feet above ground level (AGL). Steep approach flight training conducted in this manner should only be conducted in visual meteorological conditions (VMC). Before each approach, the flight instructor should brief the pilot on the EGPWS alerts that will be activated during the final phase of the approach and landing. The flight instructor should emphasize that, for the purpose of flight training only, the pilot should not react to these alerts.

NOTE 2: Some airports with steep approaches require previous steep approach experience prior to conducting a steep approach at that airport. Practicing approaches at 5.5 ° may be accomplished by the method described in NOTE 1.

STEEP APPROACH CHECKING REQUIREMENTS

There is no requirement for knowledge checking or flight proficiency testing for the Global 5000/6000 steep approach qualification. Proof of completion of Global 5000/6000 steep approach training is sufficient for showing qualification.

STEEP APPROACH CURRENCY REQUIREMENTS

If within the past 6 months a pilot has not conducted at least one steep approach, then a review of all the listed items for ground training above must be completed and properly documented prior to conducting steep approach operations.

STEEP APPROACH RECURRENT REQUIREMENTS

As a minimum, regardless of the number of steep approaches completed, a review of all ground training items must be accomplished annually and documented in a manner acceptable to the Administrator.