Civil Aviation Administration of China (CAAC)

Aircraft Evaluation Group (AEG)

Aircraft Evaluation Report

For

BD-700-1A10 (Global Express, Global 6000)

BD-700-1A11 (Global 5000, Global 5000 GVFD)

Rev. 0 Date: August 12, 2013

Manufacturer: Bombardier Inc

Revision Record & Approval

Revision No.	Section	Page No.	Date
Revision 0	All Note: Including the conclusion of original evaluation in March 2010 and evaluation for Global Vision Flight Deck (Global 6000 and Global 5000 GVFD), Honeywell avionics Batch 3 for Global Express and Global 5000.	All	August 12, 2013

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Foreword

The BD-700 series aircraft was first type certificated by Transport Canada (TCCA) in July 1998 as transport category airplane with designation as BD-700-1A10 (Global Express for commercial designation), BD-700-1A11 is the variant with commercial designation as Global 5000 which was type certificated in March 2004 by TCCA. BD-700-1A10 (Global Express) and BD-700-1A11 (Global 5000) type certificate was validated by CAAC Airworthiness Department in June 2010.

The Global Vision Flight Deck is the modification installs the Rockwell Collins Pro Line Fusion avionics suite for BD-700-1A10 (commercial designation as Global 6000) and BD-700-1A11 (commercial designation as Global 5000 or Global 5000 GVFD). Global 6000 and Global 5000 GVFD were approved by TCCA in December 2011, and validated by CAAC Airworthiness Department in June 2013.

The BD-700-1A10 (Global Express) and BD-700-1A11 (Global 5000) Airplanes were evaluated by CAAC AEG in January 2010. In addition, the operational suitability of Global Vision Flight Deck modification (Global 6000 and Global 5000 GVFD), Honeywell avionics Batch 3 for Global Express and Global 5000 were evaluated by CAAC AEG in July 2013.

This report was first drafted in the frame of CAAC AEG evaluation in July 2013, which covers all the previous AEG evaluation determinations for BD-700-1A10 (Global Express) and BD-700-1A11 (Global 5000) Airplanes which were issued in March 15, 2010, and since this report is formally issued, the individual CAAC AEG validation and approval letters for BD-700-1A10 (Global Express) and BD-700-1A11 (Global 5000) Airplanes (AEG-BD700 -2010001 to 2010005) are cancelled.

Section 1: Pilot Type Rating and Qualification Specification

1.1 Statement and Explanation

This section is the formal notification that CAAC AEG has conducted a Flight Standardization Board (FSB) evaluation for Bombardier BD-700-1A10 (Global Express, Global 6000) and BD-700-1A11 (Global 5000, Global 5000 GVFD) Airplanes based on the Operational Evaluation Board (OEB) Report published by TCCA, which specifies the pilot type rating, training, checking, and currency specifications for the flight crews.

Hereby, the provisions in this section can be used, as the basis, by Chinese operators to develop their pilot qualification and training program for above airplanes.

Alternate means of compliance to the requirements of CCAR 61, 91, 135, other than as specified in the provisions of this section, must be approved by Flight Standards Department of CAAC. If alternate compliance is sought, operators will be required to establish that proposed alternate means provide an equivalent level of safety to the provisions of this section, and analysis, demonstrations, proof of concept testing, differences documentation, or other evidence may be required.

Find TCCA OEB Report here:

http://www.tc.gc.ca/eng/civilaviation/standards/commerce-oeb-reports-3632.htm

1.2 Pilot Type Rating and Licence Endorsement

Upon the FSB evaluation, the Pilot Type Rating for Bombardier BD-700-1A10 (Global Express, Global 6000) and BD-700-1A11 (Global 5000, Global 5000 GVFD) Airplanes is listed as following:

Manufacturer	Aircraft Type	Pilot Type Rating
Bombardier Inc	BD-700-1A10 (Global Express, Global 6000)	BD700
	BD-700-1A11 (Global 5000, Global 5000 GVFD)	

License endorsement:

"BD700" for getting a type rating from BD-700-1A10 (Global Express or Global 6000) or BD-700-1A11 (Global 5000 or Global 5000 GVFD), and checking records should also be shown for the specific airplane model/variant.

1.3 ODR and MDR

Sample Operator Difference Requirement (ODR) and Master Difference Requirement (MDR) tables for BD-700-1A10 (Global Express, Global 6000) or BD-700-1A11 (Global 5000, Global 5000 GVFD) have been given as the following:

- Global Express (Batch 2) to Global 5000 (Batch 2), or Global 6000 (software level 4.3.1) to Global 5000 GVFD (software level 4.3.1)
- Global 5000 (Batch 2) to Global Express (Batch 2), or Global 5000 GVFD (software level 4.3.1) to Global 6000 (software level 4.3.1)
- Global Express (Batch 2) to Global 6000 (software level 4.3.1), or Global 5000 (Batch 2) to Global 5000 GVFD (software level 4.3.1)
- Global 6000 (software level 4.3.1) to Global Express (Batch 2), or Global 5000 GVFD (software level 4.3.1) to Global 5000 (Batch 2)

MDR Table

		FROM AIRPLANE			
		BD-700-1A10 (Global Express)	BD-700-1A10 (Global 6000)	BD-700-1A11 (Global 5000)	BD-700-1A11 (Global 5000 GVFD)
TO AIRPLANE	BD-700-1A10 (Global Express)	--- 1*3*	C/C/C 2*4*	A/A/A 1*3*	C/C/C 2*
	BD-700-1A10 (Global 6000)	C/C/C 2*4*	--- 2*	C/C/C 1*2*4*	A/A/A
	BD-700-1A11 (Global 5000)	A/A/A 1*3*	C/C/C 1*, 2*4*	--- 1*	C/C/C
	BD-700-1A11 (Global 5000 GVFD)	C/C/C	A/A/A	C/C/C	--- 2*

***1*:** *The MDR table is based on Honeywell avionics version Batch 2. MDR between Batch2 and Batch 3 is B/A/B.*
***2*:** *The MDR table is based on Rockwell Collins avionics software version 4.3.1.*
***3*:** *See Section 6 for additional HUD and BEVS training requirements for the Global Express and Global 5000.*
***4*:** *The MDR table is based on Global Express and Global 5000 equipped with Thales HUD and BEVS.*

1.4 Specification for Training

The Type Rating Training Syllabus for BD-700-1A10 (Global Express, Global 6000) and BD-700-1A11 (Global 5000, Global 5000 GVFD) recommended by Bombardier Inc is provided as following in the" FAA (Part 142) Training Control Manual – Global" of Bombardier Aerospace Training Centre, and has to be considered as a minimum:

- Long Core Curriculum BBD-700 (Chapter One, Section 1): for Global Express

- Long Core Curriculum BBD-700 featuring Vision Flight Deck (Chapter One, Section 2): for Global 6000 and Global 5000 GFVD

- Specialty Curriculum BBD-700: Differences Training (Chapter Three, Section 2a) for pilot current on Global Express or Global 5000 to upgrade to Global 6000 or Global 5000 GVFD

- Specialty Curriculum BBD-700: Differences Training (Chapter Three, Section 2b) for pilot current on Global 6000 or Global 5000 GVFD to Global Express or Global 5000

- Specialty Curriculum BBD-700: Batch 3 upgrade (Chapter Three, Section 26): for pilot current on Global Express or Global 5000 Batch 2 to Batch 3.

Note 1: *"BBD-700" is the pilot type rating designated by FAA for BD-700.*
Note 2: *Reference Section 6 of this report for HUD, HUD/EVS Training specifications.*
Note 3: *BATC eLearning recommended for Global Express/5000 Batch 2 to Batch 3.*
Note 4: *Line indoctrination with a line training Captain to consolidate the training immediately following the above difference training recommended.*
Note 5: *Above Training Curriculums are available by request to Bombardier Inc.*

Specifications for particular emphasis elements during Global Express and Global 5000 ground and flight training are as following:

Ground Training:

1) High altitude physiology;
2) Fatigue, sleep loss, and circadian disruption
3) International operating procedures for special use airspace such as: MNPS, RVSM, RNP-10, and RNP-5 operations;
4) Flight Management System (FMS);
5) Fuel characteristics and fuel temperature management at high altitudes and cold temperatures;
6) Wing leading edge contamination and its effect on clean (slats IN/flaps UP) stall speed;
7) DC power 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;
8) Inconsistent terminology (terms used in documentation related to systems such as power plant, FMS and performance);
9) Fuel recirculation inhibit; and
10) FMS landing field length.

Systems Integration Training (Flight Training Device - Level 5):

1) Automatic Flight Control System (AFCS);
2) Primary Flight Display (PFD) Flight Director Annunciator (FDA);
3) Flight Management System (FMS);
4) Electrical Management System (EMS);
5) Guidance Panel Indications/Selections for autopilot, yaw damper, and coupling; and
6) Fuel System and detection and procedures for fuel leakage.

Flight Training (Full Flight Simulator - Level C or D and/or aircraft):

1) Aileron/elevator disconnect (jammed controls in each axis);
2) Primary Flight Display (PFD), Multifunction Display (MFD), and EICAS reversionary modes;
3) Integrated use of EICAS messages, switch positions and synoptic pages to determine aircraft system status;
4) Delayed engine response to full power applications at high altitudes. (especially high altitude stall recovery);
5) Low energy rejected landing from idle thrust;
6) High altitude (above 45,000 ft.) handling characteristics with the autopilot and yaw damper inoperative;
7) AFCS pitch (PIT) mode characteristics (flight path vs. pitch angle);
8) EGPWS (including the loss of terrain mode when conducting the DC override test, and making MFD selections);
9) Traffic Collision and Avoidance System (TCAS);
10) Wind shear;
11) Loss of all DC Power;
12) Stall warning advance; and
13) Loss of Autothrottle during One Engine Inoperative (OEI) Flight

For Global Express/5000 Batch 2 to Batch 3 differences training, the following training areas of special emphasis should be addressed:

1) Flight crew should be provided with and review the PTG, ORM, FCOM's, QRH, and FMS pilot guide that detail the differences between Batch 2 and Batch 3 for self-study prior to undertaking the BATC eLearning.
2) Flight crew should clearly understand FGP selections and PFD annunciations while conducting FMS based approaches using LNAV, VPTH, VGP, and LPV (optional) functions.
3) 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 below the missed approach altitude (MDA or landing elevation) should be emphasized. This training area is of particular importance for operators flying mixed Batch 2 and Batch 3 aircraft configurations.
4) Bombardier and/or operator developed SOPs related to CRM and human factors in the use of FANS CPDLC (optional) including division of duties, cross-confirmation, aircraft flight path changes, etc.

For initial training on Global 6000 or Global 5000 GVFD, and differences training from Global Express or Global 5000 to upgrade to Global 6000 or Global 5000 GVFD, the following training areas of special emphasis should be addressed:

1) ☐Flight deck display layout (AFD/DU) and functionality;
2) ☐Control panels – CTP, ACP, RTSA, CNS, MKP and CCP;
3) ☐Emergency Descent Mode (EDM) and functionality;
4) ☐Under speed protection;
5) ☐Nav-to-Nav transfer, GPS/WAAS/LPV/RNP/PBN, and instrument approach procedures;
6) ☐DC power failure modes with emphasis on loss of all DC electrical power;
7) ☐AFCS modes, AP and AT, AEO and OEI in all phases of flight including OEI go-around, PFD, FDA and FMA indications;
8) ☐AP behaviour during wind shear escape guidance;
9) ☐TAWS and ACAS;
10) ☐Use of EVS and SVS for situational awareness only;
11) ☐Caution and alert messages on the EICAS and HSI, and associated human factors issues;
12) ☐Use of Flight Management System (FMS) including FMS take-off preparation and approach preparation;
13) ☐Electrical Management System (EMS); and
14) ☐Crew Resource Management (CRM) with regard to the new functionalities.

1.5 Specification for Checking

As required by CCAR Part 61 and 135.

For mixed fleet flying of Global Express and Global 5000, or Global 6000 and Global 5000 GVFD, no check related to differences is required, however, a crewmember is responsible for knowledge of each variant flown, and differences items may be included as an integral part of subsequent recurring proficiency checks.

Note: *For Global Express/Global 5000 differences between Honeywell avionics Batch 2 and Batch 3, checking on one avionics configuration is sufficient for qualification.*

Following the differences training from Global Express or Global 5000 to upgrade to Global 6000 or Global 5000 GVFD, checking for the training areas of special emphasis should be addressed.

For mixed fleet flying of Global Express/Global 5000 and Global 6000/Global 5000 GVFD, proficiency checking should be alternated between variants, addressing the differences of all applicable variants on each occasion.

1.6 Specification for Currency

As required by CCAR Part 61 and 135.

For mixed fleet flying of Global Express and Global 5000, or Global 6000 and Global 5000 GVFD, maintenance of currency in any one variant suffices for the other variant.

Note: *For Global Express/Global 5000 differences between Honeywell avionics Batch 2 and Batch 3, flight crews conduct a self-review or a crew review of FGP, PFD annunciation, altitude pre-selector, and FANS (optional) differences immediately prior to operating the other avionics configuration.*

For mixed fleet flying of Global Express/Global 5000 and Global 6000/Global 5000 GVFD, perform at least one sector (as PF or PM/PNF) in the Global Express or Global 5000, and at least one sector in the Global 6000 or Global 5000 GVFD within 90 days.

1.7 Specification for Flight Simulation Training Devices

As qualified per CCAR Part 60.

For initial and difference training and checking, the specific training device reflect each configuration of Global Express, Global 5000, Global 6000, and Global 5000 GVFD should be used.

Section 2: Master Minimum Equipment List

2.1 Statement and Explanation

This section is the formal notification that CAAC AEG has conducted Flight Operation Evaluation Board (FOEB) evaluation for Bombardier BD-700-1A10 (Global Express, Global 6000) and BD-700-1A11 (Global 5000, Global 5000 GVFD) Airplanes based on the Global Express BD-700-1A10 & Global 5000 BD-700-1A11 Master Minimum Equipment List (MMEL) approved by TCCA, which outlines the items of equipment that may be inoperative and yet maintain an acceptable level of safety by appropriate conditions and limitations.

Note: *Even though the cover page of MMEL only specifies Global Express and Global 5000, but the document covers all BD-700-1A10 and BD-700-1A11 model/variant.*

Hereby, the MMEL and its future revisions approved by TCCA can be used, as the basis, by Chinese operators to develop their Minimum Equipment List (MEL) for above airplane.

Find TCCA MMEL here:

http://wwwapps2.tc.gc.ca/Saf-Sec-Sur/2/MEL-LEM/m_e_l_s.aspx?lang=eng
Also available on the Bombardier Customer Information Centre website:
https://customer.aero.bombardier.com/cic/public/

2.2 CAAC Supplemental

Not applicable.

Section 3: Maintenance Review Board Report

3.1 Statement and Explanation

This section is the formal notification that CAAC AEG has conducted Maintenance Review Board (MRB) evaluation for Bombardier BD-700-1A10 (Global Express, Global 6000) and BD-700-1A11 (Global 5000, Global 5000 GVFD) Airplanes based on the Bombardier Global/BD-700 Maintenance Review Board Report (MRBR) approved by TCCA, which outlines the initial minimum maintenance requirements to be used in the development of an approved operator's maintenance program for the airframe, engines, systems and components.

Note: MRB Report is included in the Time Limits / Maintenance Checks Section 3

Hereby, the MRBR and its future revisions approved by TCCA can be used, as the basis, by Chinese operators to develop their maintenance program for above airplanes.

MRBR distribution:

Available on the Bombardier Customer Information Centre website:
https://customer.aero.bombardier.com/cic/public/

3.2 CAAC Supplemental

Not applicable.

Section 4: Operational and Continued Airworthiness Instructions

4.1 Statement and Explanation:

This section is the formal notification that CAAC AEG has conducted evaluation of the operational and continued airworthiness instructions for Bombardier BD-700-1A10 (Global Express, Global 6000) and BD-700-1A11 (Global 5000, Global 5000 GVFD) Airplanes based on the relevant policies and procedures of Bombardier Inc.

Hereby, the Operational & Continued Airworthiness Instructions documents listed in the attachment were found acceptable by CAAC AEG, and will give the necessary guidance for properly operating and maintaining the Bombardier BD-700-1A10 (Global Express, Global 6000) and BD-700-1A11 (Global 5000, Global 5000 GVFD) Airplanes within the approved operating conditions and limitations.

This acceptance may not assure the accuracy and applicability of the content in each document, it is the aircraft owner's or operator's responsibility to report any defect or discrepancy in the documents to the aircraft manufacturer, or report to CAAC AEG by mail box: aeg@caac.gov.cn.

Operational & Continued Airworthiness Instructions distribution:

By Bombardier either in Hard copy, CD/DVD and online website.

4.2 List of Operational and Continued Airworthiness Instructions for BD-700-1A10 and BD-700-1A11

Manual	Manual Reference				Revision/ Date
	BD-700-1A10		BD-700-1A11		
	Global Express	Global 6000	Global 5000	Global 5000 GVFD	
Time Limits and Maintenance Checks	BD-700 TLMC	GL 6000 TLMC	GL 5000 TLMC	GL 5000 GVFD TLMC	As revised
Maintenance Planning Document	BD-700 MPD	GL 6000 MPD	GL 5000 MPD	GL 5000 GVFD MPD	As revised
System Description Section (AMM Part One)	BD-700 AMM	GL 6000 AMM-SDS	BD-700 AMM	GL 5000 GVFD AMM-SDS	As revised
Aircraft Maintenance Manual (Part Two)	BD-700 AMM	GL 6000 AMM	BD-700 AMM	GL 5000 GVFD AMM	As revised
Structural Repair Manual	BD-700 SRM	GL 6000 SRM	BD-700-1A11 SRM	GL 5000 GVFD SRM	As revised
Nondestructive Testing Manual	BD-700 NDTM	GL 6000 NDT	BD-700-1A11 NDTM	GL 5000 GVFD NDT	As revised
Ground Handling and Servicing Information	BD-700 GHSI	GL 6000 GHSI	GL 5000 GHSI	GL 5000 GVFD GHSI	As revised
Illustrated Tool and Equipment Manual	BD-700 ITEM	GL 6000 ITEM	BD-700 ITEM	GL 5000 GVFD ITEM	As revised
Aircraft Illustrated Parts Catalog	BD-700 AIPC	GL6000 AIPC	GL 5000 AIPC	GL 5000 GVFD AIPC	As revised
Wiring Manual	BD-700 WM	GL 6000 WDM	GL 5000 WM	GL 5000 GVFD WDM	As revised
Wiring List Manual	BD-700 WLM	GL 6000 WLM	GL 5000 WLM	GL 5000 GVFD WLM	As revised
Flight Crew Operating Manual (Volume 1 & 2)	CSP 700-6	GL 6000 FCOM	CSP 700-5000-6	GL 5000 GVFD FCOM	As revised
Quick Reference Handbook (Volume 1 & 2)	CSP 700-15	GL 6000 QRH	CSP 700-5000-15	GL 5000 GVFD QRH	As revised
Weight and Balance Manual	BD-700 WBM	GL 6000 WBM	BD-700-1A11 WBM	GL 5000 GVFD WBM	As revised
System Schematic Manual	BD-700 SSM	GL 6000 SSM	GL 5000 SSM	GL 5000 GVFD SSM	As revised
Standard Practices Manual	SPM				As revised
Component Maintenance Manual (Part One)	BD-700 CMM				As revised
Flight Planning and Cruise Control Manual (Metric)	CSP 700-23				As revised

Note 1: *The acceptance of above manuals is not affected by document reference numbers changed due to customization.*

Note 2: *The supplemental manual will be published for custom interior installation.*

Section 5: CCARs Compliance Checklist

5.1 Statement and Explanation:

This section is the formal notification that CAAC AEG has developed the CCAR-91R2 and CCAR-135 compliance checklist for Bombardier BD-700-1A10 (Global Express, Global 6000) and BD-700-1A11 (Global 5000, Global 5000 GVFD) Airplanes based on the following aircraft configuration:

-Transport Canada Type Certificate Data Sheet No. A177, Issue 15

The checklist is provided as an aid to identify those specific requirements of rules for which compliance has already been demonstrated for the type design. The checklist also notes the requirements of rules which remain to be demonstrated compliance by the operators.

When the aircraft configuration differs from the above stated aircraft configuration, it is the responsibility of the operator and it's CAAC Principle Inspector (PI) to evaluate those differences and develop the compliance to the relevant requirements of rules.

It also remains the responsibility of the operator and it's PI to evaluate the corrective actions for those items not satisfactorily addressing compliance in the checklist prior to approval of the appropriate operation.

5.2 CCAR-91R2 Compliance Checklist for BD-700-1A10 and BD-700-1A11

Articles/Subject	Compliance	Remark/Limitation
§91.401 Civil aircraft: Certifications required	Complies with Fuel venting and exhaust emissions requirements	Other requirements should be checked by PI.
§91.403 Instrument and Equipment for VFR operation	Complies	
§91.405 Instrument and Equipment for IFR operation	Complies	
§91.407 Instruments and Equipments for night and over-the-top operation	Complies except for lights in passenger compartments will be determined by complete custom interior installation	1. Lights in passenger compartments for complete custom interior installation should be checked by PI. 2. Requirements in operation should be checked by PI.
§91.409 Mach number indicator	Complies	
§91.411 Radio communication equipment	Complies	Requirements in operation should be checked by PI.
§91.413 Navigation equipment	Complies	Requirements in operation should be checked by PI.
§91.415 Emergency and life-saving equipment	Hand fire extinguisher installed in cockpit, other complies will be determined by complete custom interior installation	Equipment for complete custom interior installation should be checked by PI.
§91.417 Additional emergency and Life equipments for over water operation	Life vests are installed for the pilot and copilot , other complies will be determined by complete custom interior installation	Equipment for complete custom interior installation should be checked by PI.
§91.419 Additional emergency and Life-saving equipment for rotorcraft over water flights	Not applicable	
§91.421 Additional emergency and Life-saving equipment for flights over designated land areas	Complies will be determined by complete custom interior installation	Equipment for complete custom interior installation should be checked by PI.
§91.423 Oxygen equipment-operation at high altitude	Breathing Oxygen and Indicating Device, Quick Donning Masks Installed for pilot and copilot, complies of passengers Oxygen equipment will be determined by	Passengers Oxygen equipment for complete custom interior installation should be checked by PI

Articles/Subject	Compliance	Remark/Limitation
	complete custom interior installation	
§91.425 Equipment for operation in icing conditions	Complies	
§91.427 ATC transponder and altitude reporting equipment	Complies	Requirements in operation should be checked by PI.
§91.429 Altitude alerting system or device: Turbojet-powered civil airplanes.	Complies	Requirements in operation should be checked by PI.
§91.431 Weather radar	Complies	Requirements in operation should be checked by PI.
§91.433 Flight recorder	Complies for some variant and configuration	1. ATC data-link record requirements complies for Global 6000, Global 5000 GVFD, and Global Express, Global 5000 with Honeywell avionic batch 3. 2. Requirements in operation should be checked by PI.
§91.435 Emergency locator transmitter	Complies	Requirements in operation should be checked by PI.
§91.437 Terrain awareness and warning system.	Complies	Requirements in operation should be checked by PI.
§91.439 Traffic Alert and Collision Avoidance equipment and use	Complies	Requirements in operation should be checked by PI.
§91.441 Radiation indicator	Not Complies	Maximum operating altitude should be limited to 49,000 feet.
Appendix B Category II Operations: Manual, Instruments, Equipment, and Maintenance	Complies	Requirements in operation should be checked by PI.
Appendix C Operations within airspace designated as Minimum Navigation Performance Specification Airspace.	Complies	Requirements in operation should be checked by PI.
Appendix D Operations in Reduced Vertical Separation Minimum(RVSM)	Complies	Requirements in operation should be checked by PI.

5.3 CCAR-121R4 Compliance Checklist

Not applicable.

5.4 CCAR-135 Compliance Checklist for BD-700-1A10 and BD-700-1A11

Articles/Subject	Compliance	Remark/Limitation
§135.75 Inspectors credentials: admission to pilots' compartment	Complies	
§135.146 Emergency locator transmitters	Complies	
§135.149 Dual controls required.	Complies	
§135.151 Equipment requirements: General.	Complies	
§135.153 Public address and crewmember interphone systems.	Not applicable	Maximum approved passenger seating configuration of 19.
§135.155 Flight Data Recorder	Complies	Requirements in operation should be checked by PI.
§135.157 Cockpit voice recorders.	Complies	1. ATC data-link record requirements complies for Global 6000, Global 5000 GVFD, and Global Express, Global 5000 with Honeywell avionic batch 3. 2. Requirements in operation should be checked by PI
§135.159 Ground proximity warning system	Complies	Requirements in operation should be checked by PI.
§135.161 Terrain awareness and warning system （TAWS）	Complies	Requirements in operation should be checked by PI.
§135.163 Fire extinguishers: Passenger carrying aircraft.	Complies	The number and location of hand fire extinguishers in the passenger compartment should be check by PI according to the appropriate passenger loading

Articles/Subject	Compliance	Remark/Limitation
§135.165 Oxygen equipment requirements.	Complies	Oxygen availability and duration computation per FCOM should be checked by PI.
§135.167 Equipment requirements: Carrying passengers under VFR at night or under VFR over the top conditions	Complies	
§135.169 Radio and navigational equipment: Carrying passengers under VFR at night or under VFR over the top.	Complies	
§135.171 Equipment requirements: Aircraft carrying passengers under IFR	Complies	
§135.173 Radio and navigational equipment requirement for extended overwater or IFR operations.	Complies	
§135.175 Emergency equipment requirements for extended overwater operations.	To be determined by complete custom interior installation	1. Life Rafts installation and its capacity should be checked by PI according to the appropriate passenger loading for extended over water operations. 2. Requirements in operation should be checked by PI.
§135.177 Shoulder harness installation requirement at flight crewmember stations.	Complies	Requirements in operation should be checked by PI.
§135.179 Airborne thunderstorm detection equipment requirements.	Complies	Requirements in operation should be checked by PI.
§135.181 Airborne weather radar equipment requirements.	Complies	Requirements in operation should be checked by PI.
§135.183 Emergency equipment requirements for aircraft having a passenger seating configuration of more than 19 passengers.	Not applicable	Maximum approved passenger seating configuration of 19.

Articles/Subject	Compliance	Remark/Limitation
§135.185 Additional emergency equipments	Not applicable	Maximum approved passenger seating configuration of 19
§135.189 Airborne Collision Avoidance System (ACAS II)	Complies	
§135.191 Performance requirements: Aircraft operated over the top or in IFR conditions	Complies	Requirements in operation should be checked by PI
§135.193 Land aircraft operated over water	Complies	Requirements in operation should be checked by PI
§135.197 Language requirement for placards and markings	To be determined by complete custom interior installation	Require further check by PI before operation
§135.199 Pitot heat indication systems.	Complies	
§135.203 Materials for compartment interiors	Not applicable	Cargo compartment is certified as a class B baggage compartment.

Section 6: Other Evaluation Items

6.1 Forward Observer Seat

Based on the supporting analysis documents provided by Bombardier and reference to the determination made by the FAA, CAAC AEG concluded that the Forward Observer's Seat of Bombardier BD-700-1A10 (Global Express, Global 6000) and BD-700-1A11 (Global 5000, Global 5000 GVFD) Airplanes is considered to have met the requirements of AC-121-28.

Modifications to the above facilities from the original specifications will need approval by the responsible Principle Inspector (PI) of CAAC, additional analysis, demonstrations, proof of concept testing, differences documentation, or other evidence may be required.

6.2 Flight Crew Sleeping Quarters

Not applicable.

6.3 Electronic Flight Bag (EFB)

For BD-700-1A10 (Global 6000) and BD-700-1A11 (Global 5000 GVFD), Chart, Departure Performance and Electronic Checklist (ECL) are integrated functions of avionic suite, and already subject airworthiness approval. Even though they are typical EFB applications, there is no need to special operational approval if the provisions in AFM are followed, except when operators introduce their own Special Operating Procedures into the ECL in addition to those in the Bombardier Aerospace (BA) provided ECL.

Note: *Operators who introduce Special Operating Procedures into the ECL should use the Rockwell Collins Checklist Creation Tool (RCCT) which is a PC based application that allows a user to create a loadable checklist database for use by the on-board Electronic Checklist function. Prior approval is required by local PI.*

6.4 Head-up Display and Enhanced (Flight) Vision System

6.4.1 Thales Head-up Display (HUD)

A Thales HUD is an optional installation for Bombardier BD-700-1A10 (Global Express) and BD-700-1A11 (Global 5000), and is certified for operationally use for all phases of flight (Low visibility takeoff and CAT II approach operations were not operationally evaluated).

Note: *See Airplane Flight Manual (AFM) Supplement 10 for detail.*

Training:

The Pilot Training Course for HUD specified by Bombardier is provided as following in the" FAA (Part 142) Training Control Manual – Global" of Bombardier Aerospace Training Centre, and has to be considered as a minimum:

- Specialty Curriculum BBD-700: Basic HUD Initial (Chapter Three, Section 5).

Note 1: *The HUD training program focuses principally upon training events flown in the left seat by the Pilot-In-Command (PIC) as Pilot Flying (PF). Nevertheless, HUD training of Pilot Not Flying (PNF) Second-In-Command (SIC) duties in the right seat is required, when there are SOP differences for the PNF when the PF is heads up (compared to heads down). SIC HUD familiarization flown in the left seat is recommended.*

Note 2: *The HUD PICs should complete line indoctrination employing the HUD, include at least three HUD assisted takeoffs, one visual approach, and two instrument approaches in VMC. For instrument approach operations in IMC, PICs should accomplish at least ten manually flown HUD assisted takeoffs and ten HUD approaches to authorized minima in VMC conditions. Each approach should terminate in a manually controlled HUD assisted landing or HUD assisted go-around.*

Note 3: *Training course are available by request to Bombardier Inc.*

HUD Special training emphasis should be placed in the following areas:

a. Crew coordination;
b. Crew briefings and callouts;
c. Duties of flying and non-flying pilots; and
d. EICAS messages and use of QRH and Checklists applicable to HUD.

Checking:

The pilot should complete a full proficiency check that samples the employment of the HUD following initial type training that integrates the HUD or HUD training that occurs immediately following the initial type training, and the following manoeuvres should be evaluated as a minimum:

a. Engine failure on take-off and departure;
b. Instrument approach and missed approach OEI; and
c. Failure of HUD during instrument approach.

For recurrent training, the checking should include the following HUD operations in addition to regular requirements:

a. Takeoff, at the lowest authorized visibility, with crosswind;
b. Takeoff, at the lowest authorized visibility, engine failure before or after V1 with crosswind;

c. Approach and landing, at the lowest authorized visibility, with crosswind;
d. Approach, at the lowest authorized visibility, with crosswind, with missed approach;
e. Non-precision approach(s), including circling (if applicable);
f. Selected abnormal/emergency manoeuvres. This should include approach and landing with flaps retracted, and approach and landing OEI.

Note: *When there are SOP differences for the PNF when the PF is heads up (compared to heads-down), the PNF should complete a partial PPC on HUD related PNF duties, within 30 days subsequent to completion of HUD training.*

Currency:

The pilot should have completed at least three takeoffs, approaches and landings using the HUD in the aeroplane; or have completed at least three takeoffs, approaches and landings as PF using the HUD in a TCCA approved level C (or higher) Global full flight simulator with day and night visual displays, within the previous 90 days before acting as PF using the HUD.

6.4.2 Rockwell Collins Head-up Display (HUD)

A Rockwell Collins HUD is a standard installation for Bombardier BD-700-1A10 (Global 6000) and BD-700-1A11 (Global 5000 GVFD), and its limitation and operational procedures are incorporated in the AFM.

For Rockwell Collins HUD, pilot training, checking and currency specification are also incorporated in BD-700-1A10 (Global 6000) and BD-700-1A11 (Global 5000 GVFD) pilot qualification specification as in Section 1.

6.4.3 Bombardier Enhanced Vision System (BEVS)

The BEVS is a THALES HUD, which integrates an Infra-Red (IR) image onto the HUD from a sensor mounted on the nose of the aircraft. The BEVS is certified for use as an aid during all phases of flight: taxi, takeoff, climb, cruise, descent and landing. In addition, the BEVS is certified for descent to 100 feet HAT in Instrument Meteorological Conditions (IMC) when operated in accordance with the limitations contained in AFM.

Note: *See Airplane Flight Manual (AFM) Supplement 22 for detail.*

Based on TCCA operational evaluation determination, CAAC AEG found BEVS operationally suitable for providing situational awareness for the crew, as well as for applying operational credit (operations below DA/MDA down to 100ft above the runway threshold elevation) when operated by crew members trained and qualified according to the provision as following:

Training:

The Pilot Training Course for BEVS specified by Bombardier is provided as following in the" FAA (Part 142) Training Control Manual – Global" of Bombardier Aerospace Training Centre, and has to be considered as a minimum:

- Specialty Curriculum BBD-700: Basic BEVS Initial (Chapter Three, Section 6).

Note 1: *As a prerequisite for BEVS training, pilots should have successfully completed HUD training in the Global Aircraft, however HUD and EVS training can be conducted concurrently.*
Note 2: *For authorization to descend below published minima to 100 ft Height Above Threshold (HAT), ground training on the Global aircraft for low visibility procedures or CAT II training is required, if such training is not included in the BEVS.*
Note 3: *Training course are available by request to Bombardier Inc.*

BEVS special training emphasis should be placed in the following areas:

GROUND TRAINING

a. Crew briefings, callouts and Standard Operating Procedures (SOP's);
b. Duties of PF and PNF;
c. Crew coordination and Crew Resource Management (CRM);
d. EICAS messages and use of QRH and Checklists applicable to BEVS;
e. Transition from EVS imagery to non-EVS, visual conditions. (Maximum use should be made of videotapes of actual EVS approaches. The relative luminosity between IR imagery and that of approach lighting systems should be identified);
f. Characteristics of Raster vs. Stroke displays, and effects of lighting conditions and crosswinds on BEVS symbology and Flight Path Vector (FPV);
g. Visual anomalies such as "noise" and "blooming";
h. Appropriate use of Clear Switch;
i. Importance of the "design eye position" in acquiring the proper EVS image;
j. Where PF should look to acquire required visual references for descent below published Decision Altitude (DA);
k. Importance of cross checking the BEVS instrumentation presentations against the EVS visual scene presentation to enable the pilot to recognize

malfunctions of the EVS, navigational guidance information, and improper presentation of elements in the visual scene during an approach;

l. Identification of 100 ft Height Above Threshold using Barometric Altitude and monitoring of Radio Altitude and response to altitude callouts and alerts and need for FMS temperature compensation for cold temperatures;

m. AFM Performance & Obstacle Clearance on Go Around; Pilots should be made aware they may not have obstacle protection when initiating a missed approach from 100 ft HAT;

n. Use of AP & AT coupled approaches & awareness of Autopilot Minimum Engage Height (MEH) for LNAV/VNAV approaches;

o. Familiarization with criteria for descent below published minima to 100 ft. HAT.

p. Effective and appropriate monitoring by PNF, of EVS imagery presented on FMS CDU

Flight Training

a. Ground operation:

Sufficient demonstrations should be provided of HUD imagery over various terrain features during ground and flight operations under various conditions. IR imagery of other aircraft, vehicles, buildings and airport lighting systems should also be provided

b. Visual Take-offs, Circuits and Approaches

1) Normal Take-off and Landing with crosswind;
2) Visual approaches to runways at night with minimal lighting (“black hole” approaches) and use of FPV and Flight Path Reference Cue (FPARC) to achieve desired descent angle.

c. Instrument Approaches:

1) ILS and LNAV/VNAV approaches to lowest published minima with missed approach or landing;
2) ILS and LNAV/VNAV approaches to lowest published minima and acquisition of sufficient EVS image to continue to 100 ft HAT. Acquisition of required visual references without aid of EVS above 100 ft HAT followed by a landing or missed approach;

d. Abnormal/Emergency Operations:

1) Failure of BEVS, or
2) Failure of the BEVS preventing continued approach when below published minima on a Category 1 ILS.

Line Indoctrination

For situation awareness, PICs should complete at least three BEVS assisted takeoffs at night, one visual approach at night, and two instrument approaches in VMC.
For operation credit, PICs should accomplish at least three manually flown BEVS assisted night takeoffs, approaches, and landings to the lowest authorized minima in VMC conditions. Each approach should terminate in a manually controlled BEVS assisted landing or BEVS assisted go-around.

Checking:

The pilot should complete a full proficiency check that samples the employment of the BEVS following initial type training that integrates the BEVS or BEVS training that occurs immediately following the initial type training, and the following manoeuvres should be evaluated as a minimum:

a. Instrument approach and landing with acquisition of the BEVS image before published minima and acquisition of required visual references without aid of BEVS above 100 ft HAT, to permit a landing; and
b. Instrument approach with acquisition of EVS image before published minima and failure of BEVS below published minima requiring a missed approach above 100 ft. HAT.

Note: *The PNF should complete a partial proficiency check on BEVS related PNF duties, within 30 days subsequent to completion of BEVS training. For recurrent training, the required manoeuvres on subsequent SIC proficiency check should include a sample of PNF duties related to the use of the BEVS.*

Currency:

The pilot should have completed at least one night takeoff, approach and landing as PF using the BEVS; or have completed at least one night takeoff, approach and landing as PF using the BEVS in a level C (or higher) Global full flight simulator with day and night visual displays and able to display a representative IR image, within the previous 90 days before acting as PF using the BEVS.

The BEVS currency requirement can be credited to the HUD currency requirements.

6.4.4 GFVD EVS / SVS

A GVFD EVS/SVS is a standard installation for Bombardier BD-700-1A10 (Global 6000) and BD-700-1A11 (Global 5000 GVFD), and its limitations and operational procedures are incorporated in the AFM.

Based on TCCA operational evaluation determination, CAAC AEG found GVFD EVS/SVS operationally suitable for providing situational awareness for the crew.

GVFD EVS/SVS has not been operationally evaluated for applying operational credit.

6.5 Emergency Evacuation Demonstration

Not applicable.

Appendix: CAAC AEG Team and Point of Contact

A.1: CAAC AEG Team (Initial Evaluation):

Capt. Wu Cheng Chang	Deputy Director General, Flight Standards Department
Mr. Xue Shi Jun	Director, Aircraft Evaluation Division, Flight Standards Department
Ms. Fan Jing Zhu	Engineer, AEG Office of Shanghai Aircraft Airworthiness Certification Center
Capt. Zhao Zhi Qiang	Test Pilot, Shanghai Aircraft Airworthiness Certification Center
Ms. Wang Hong Lei	Engineer, AEG Office of Civil Aviation Science and Technology Center

A.2: Bombardier Point of Contact (Initial Evaluation):

Mr. Al Bazeley	Supervisor, New Aircraft Programs, Bombardier Aircraft Training

B.1: CAAC AEG Team (Global 6000 and Global 5000 GVFD Evaluation):

Mr. Xue Shi Jun	Director, Aircraft Evaluation Division, Flight Standards Department
Mr. Zhu Xue Feng	Inspector, Aircraft Certification Division, Aircraft Airworthiness Certification Department

B.1: Bombardier Point of Contact (Global 6000 and Global 5000 GVFD Evaluation)

Mr. Joseph (Joe) Watson	Section Lead, Airworthiness, Global Sustaining, Business Aircraft
Mr. John Owens	Technical Pilot, New Aircraft Programs, Bombardier Aircraft Training