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Transport Canada Civil Aviation (TCCA)

OPERATIONAL EVALUATION REPORT

Revision: 5

Date: 2025-02-03

BOMBARDIER

Type Certificate Data Sheet (TCDS)	TCDS Identifier	Marketing Designation	Pilot Type Rating
A-131	CL-600-2B16	Challenger 604 (CL-604)	CL64
A-131	CL-600-2B16	Challenger 605 (CL-605)	CL64
A-131	CL-600-2B16	Challenger 605$^{(SB)}$ (CL-605$^{(SB)}$)	CL64
A-131	CL-600-2B16	Challenger 650 (CL-650)	CL64

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1. Record of revisions

Revision No.	Sections	Date
Original	All	April 2, 2007
1	Refer to revision report.	January 12, 2010
2	Amended revision number and date. Revised cover page. Amended signature title blocks. Updated Table of contents. Updated revision record. Revision 2 Summary – added. Updated acronyms. Updated EFVS status for operational use in Canada. Appendix 5 titles – changed. Appendix 7 Operation Evaluation Report Proline 21 Advanced Avionics Upgrade Ver. 1.4.1.3 FOR CL-605(SB) /CL-650 – added. Appendix 8 CL-605(SB) /CL-650 with Required Navigation Performance Authorization Required (RNP AR) 0.3 – added.	March 27, 2017
3	Steep approach operations.	August 29, 2017
4	MTO/FLEX	September 9, 2019
5	Unreliable airspeed Training Area of Special Emphasis	February 3, 2025

2. Introduction

2.1 General

The Transport Canada Flight Technical and Operator Certification (FTOC) section within the Civil Aviation Standards Branch is responsible for the TCCA Operational Evaluation (OE) program. FTOC's objectives during the operational evaluation of a new or modified aircraft are to determine:

1) The acceptability of a manufacturers training program for use by Canadian operators (private and commercial);

2) Pilot qualification and type rating requirements including training, checking, and currency requirements; and

3) The operational suitability of an aircraft type.

This report lists those determinations for use by:

1) TCCA Inspectors who approve training programs;

2) TCCA inspectors and Approved Check Pilots (ACPs) who conduct Pilot Proficiency Checks (PPCs) and issue type ratings; and

3) Aircraft operators and training providers, to assist them in developing their flight-crew member training, checking and currency programs.

Determinations made in this report are based on the evaluations of the CL64 aircraft type made in accordance with current regulations, standards, and guidance. Modifications and upgrades, or introduction of new related aircraft, may require amendment of the findings in this report.

Notes:

1. This report does not grant TCCA training program approval. It is incumbent upon the air operators or private operators to ensure their CL64 training program is approved or accepted by the Minister under the relevant TCCA regulatory framework (as applicable under subpart 704 or 604 of the *Canadian Aviation Regulations* (CARs) and with the material indicated in this report.

2. The entire report has been edited throughout with major changes and a new report format. Revision bars are not used in this revision of this report.

3. The OE activity assesses a specific training program and its content which is relevant to a specific date. Determinations made in this report do not account for any subsequent changes to the training program which have not been evaluated by the OEB.

2.2 Regulatory requirements / language

This OE report uses mandatory terms such as “must”, “shall” and “is/are required” to convey the intent of the regulatory requirements and of other guidance documents. The term “should” is to be understood to mean that the proposed method of compliance must be used, unless an alternate means of compliance has been determined and approved.

3. Highlights of change

This amendment includes revisions 1, 2, 3 and 4 that have been reformatted into the new TCCA OE report format. It also incorporates the following major changes to the previous revision:

1) Unreliable airspeed section added as a Training Area of Special Emphasis (TASE).

4. General

4.1 Scope of report

This OE report applies to the Bombardier Challenger CL600-2B16 (604 Variant), including marketing designators Challenger 605 and Challenger 650 completed in accordance with current regulations, standards, and guidance. The contents of this report are harmonized with the FAA and EASA reports where possible.

Note:

This report uses the CL64 pilot type rating (PTR) designator when referring to all designations of the 604 variant. Specific marketing designations (e.g. CL-650) are used when appropriate. Refer to the table on the cover page of this report for the relationship between the Type Certificate Data Sheet (TCDS), marketing designations and PTR designators.

4.2 Guidance material

The TCCA OEs are conducted in accordance with the latest revisions of FAA Advisory Circular (AC) AC-120-53B Change 1, Guidance for Conducting and Use of Flight Standardization Board (FSB) Evaluations, and the JOEB OPS/FCL Common Procedures for conducting Operational Evaluation Boards (Common Procedures Document (CPD)).

4.3 OE report effectiveness

Provisions of this report are effective until amended, superseded, or withdrawn by subsequent OE findings.

TCCA reserves the responsibility and authority to re-evaluate and modify sections of this report based on new or revised advisory material, amended *Canadian Aviation Regulations* (CARs), aircraft operating experience, or the evaluation of new or modified aircraft under the provisions of the CPD or FAA AC 120-53B (latest revision).

4.4 Application of OE report

All relevant parts of this report are applicable on the effective date of this report.

4.5 Alternate means of compliance

The Operation Evaluation Board (OEB) Chairman, the Program Manager of FTOC and/or the Chief of Commercial Flight Standards (CFS) should be consulted when alternate means of compliance, other than those specified in this report, are proposed. An applicant will be required to submit a proposed alternate means that provides an equivalent level of safety to the provisions of the CARs and this OE report. Analysis, demonstrations, proof of concept testing, differences documentation, and/or other substantiation may be required.

In the event an alternate compliance is sought, training program credits, simulator approvals, and device approvals may be significantly limited, and reporting requirements may be increased to ensure equivalent levels of training, checking, and currency are maintained. TCCA will generally not consider relief through alternate compliance means unless sufficient lead-time has been planned by an operator to allow for any necessary testing and evaluation.

4.6 AQP/OEB report relationship

Reserved

4.7 CL64 Operational evaluations

4.7.1 Challenger 604

In August and September 1995, the FAA Transport Aircraft Long Beach AEG (Aircraft Evaluation Group) formed an FSB (Flight Standardization Board) that evaluated the Canadair/Bombardier CL-604 as defined in FAA Type Certificate Data Sheet (TCDS) No. A21EA. The evaluation was conducted using the methods described in AC 120-53.

In 1995 TCCA did not have a formal Operation Evaluation (OE) process when the Challenger 604 was introduced, however, representatives participated as observers on the FAA FSB Evaluation of the Challenger 604 (TCDS) A-131 and adopted the FAA findings. The original FAA FSB findings are incorporated in this report.

This report will support Canadian air operators and private operators in the development of training programs and Principal Operations Inspectors (POI) in the approval of operator training programs pursuant to *Canadian Aviation Regulations* Part VII Subpart 4 or Part VI Subpart 4. Provisions of this report are effective until amended, superseded, or withdrawn by subsequent operational evaluation determinations.

4.7.2 CL-604 to CL-605 and CL-605 to CL-604

In August and September 2006 Transport Canada conducted an operational evaluation (OE) of the Bombardier Challenger 605.

The evaluation team consisted of an Operational Evaluation Board (OEB) with members from Transport Canada Civil Aviation (TCCA), a Flight Standardization Board (FSB) member from the Federal Aviation Administration (FAA) and members of the European Aviation Safety Agency (EASA). Specific details of the operational evaluation activity are contained in Appendix 4.

4.7.3 Rockwell Collins Model 6605 HUD and Enhanced Vision System (EVS) CMA-2600i Infrared Sensor System (ISS)

The Bombardier Challenger CL-605 Operational Evaluation Team consisting of TCCA, FAA and EASA members conducted an evaluation of the Rockwell Collins Model 6605 Head-up Display (HUD) and Enhanced Vision System (EVS) CMA-2600i Infrared Sensor System (ISS) in August 2009. Specific details of the operational evaluation activity are contained in Appendix 5.

4.7.4 Rockwell Collins Pro Line 21 Avionics Version 1.4.1.3 Upgrade

In September 2015, the FSB evaluated the Rockwell Collins Pro Line 21 avionics upgrades in the Challenger 605 production configuration. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 7, Challenger 650 Avionics Upgrade Version 1.4.1.3

4.7.5 RNP AR Approach (0.3)

In November 2015, the FSB evaluated the Required Navigation Performance Authorization Required (RNP AR) 0.3 capability in the upgraded Challenger 605 production configuration. It, as well as the associated AFM change, was found to be operationally suitable. Qualifications, training, and checking requirements are listed in Appendix 8, Required Navigation Performance Authorization Required (RNP AR) 0.3.

4.7.6 Steep approach

In January 2017, the FSB evaluated the London City Airport (EGLC) steep approach capability. It, as well as the associated AFM change, was found to be operationally suitable. Training and checking requirements are listed in Appendix 9, Steep approach landing operations

4.7.7 Maximum takeoff (MTO) and reduced takeoff (FLEX) thrust functionalities

In May 2019, the Transport Aircraft Long Beach AEG convened an FSB to determine operational suitability and evaluate training, checking, and currency requirements for the Challenger 650 aircraft MTO and FLEX avionics upgrade. Training and checking requirements are listed in Appendix 10, Maximum takeoff (MTO) and reduced takeoff (FLEX) thrust functionalities.

4.7.8 Unreliable airspeed

In September 2023, TCCA conducted an operational evaluation of the CL64 Unreliable Airspeed Non-Normal Procedure training. This OE, conducted at CAE Montreal, comprised of both instructor lead training (ILT) and simulator training to be included in CL64 initial and recurrent pilot training programs. More details are included in section 9.5.3 TASE unreliable airspeed.

4.7.9 Historical summary of Bombardier Challenger aircraft

CL-600-1A11, August 10, 1980;

- Original wide-body corporate aircraft,
- Serial 1002 to 1085,

CL-600-2A12 601 Variant, February 25, 1983;

- Power plant change,
- Increased range,
- Increased gross weight,

- Serial 3001 to 3066.

CL-600-2B16 601 3A Variant, April 21, 1987;

- Improved power plant,
- New avionics,
- Improved field performance,
- Serial 5001 to 5134.

CL-600-2B16 601 3R Variant, July 2, 1993;

- Increased range,
- Improved field performance,
- Increased gross weight,
- Serial 5301to 5664.

CL-600-2B16 604 Variant, September 20, 1995;

- Increased range / improved power plant,
- ProLine 4 Avionics suite,
- Improved field performance,
- Serial 5301 to 5664.

CL-600-2B16 604 Variant, November 2006 (marketed as Challenger 605);

- Passenger cabin upgrade,
- Exterior fuselage changes,
- ProLine 21 Avionics suite,
- Serial 5701 to 5990

CL-600-2B16 604 Variant, October 2016 (marketed as Challenger 650);

- Proline 21 Advanced upgrade (Bombardier Vision Flight Deck),
- Passenger cabin upgrade,
- Serial 6050 and subsequent.

5. Acronyms

14 CFR	Title 14 Code of Federal Regulations (FAA)
AC	Advisory Circular
ACP	Approved Check Pilot
ACO	Aircraft Certification Office (FAA)
ADC	Air Data Computer
ADS-B	Automatic Dependent Surveillance – Broadcast
ADS-C	Automatic Dependent Surveillance – Contract
AEG	Aircraft evaluation Group (FAA)
AEO	All Engines Operating
AFCS	Automatic Flight Control System
AFM	Aircraft Flight Manual
AGL	Above Ground Level
ALD	Actual Landing Distance
AOA	Angle of Attack
APU	Auxiliary power Unit
APR	Auxiliary Performance Reserve
AR	Authorization Required
BA	Bombardier Aerospace
BCT	Bombardier Customer Training
BTS	Bombardier Training Services
CAA	Civil Aviation Authority
CARs	*Canadian Aviation Regulations*
CAP	Canada Air Pilot
CASS	*Commercial Air Service Standards*
CAT I	Category I
CAT II	Category II
CATS	CAE Civil Aviation Training Solutions (CATS)
CBT	Computer Based Training
CC	Competency Check

CCP	Cursor Control Panel
CD	Cursor Control Display
CL-604	Challenger 604 Model CL-600-2B16 (604 Variant) serial 5301 to 5664
CL-605	Challenger 605 Model CL-600-2B16 (604 Variant) serial 5701 to 5990
CL-650	Challenger 650 Model CL-600-2B16 (604 Variant) serial 6050 and subsequent
CPD	Common Procedures Document for Conducting Operational Evaluation Boards, 10 June 2004.
CPDLC	Controller Pilot Data Link Communications
CRM	Crew Resource Management
CRT	Cathode Ray Tubes
DA/DH	Decision Altitude/Decision Height
DCP	Display Control Panel
EASA	European Aviation Safety Agency
EFB	Electronic Flight Bag
EFIS	Electronic Flight Information System
EFVS	Enhanced Flight Vision System
EICAS	Engine Indicating and Crew Alerting System
EVS	Enhanced Vision System
FAA	Federal Aviation Administration
FANS	Future Air Navigation system
FANS 1/A	Future Air Navigation System
FAR	Federal Aviation Regulation
FAF	Final Approach Fix
FCOM	Flight Crew Operating Manual
FCP	Flight Control Panel
FD	Flight Director
FFS	Full Flight Simulator
FMA	Flight Mode Annunciator
FMS	Flight Management System
FLEX	Reduced Take-Off Thrust

FPS	Flight Path Symbol
FPV	Flight Path Vector
FSB	Flight Standardization Board
FSTD	Flight Simulation Training Device
FTD	Flight Training Device
GPS	Global Positioning System
GWX	Graphical Weather
HAT	Height Above Threshold
HDD	Head Down Display
HFDS	Head-Up Flight Display System
HO	Hand Out
HUD	Heads-up-display System
IAF	Initial Approach Fix
IFIS	Integrated Flight Information System
ILS	Instrument Landing System
ILT	Instructor Led Training
IMC	Instrument Meteorological Conditions
IR	Infrared
JOEB	Joint Operational Evaluation Board
LNAV	Lateral Navigation
LPV	Localizer Precision Vertical Navigation
LCD	Liquid Crystal Display
LED	Light-Emitting Diode
LOFT	Line-Oriented Flying Training
MAP	Missed Approach Procedure
MDA	Minimum Descent Altitude
MDR	Master Difference Requirements
MLW	Maximum Landing Weight
MMEL	Master Minimum Equipment List
MEL	Minimum Equipment List

MFD	Multi-Function Display
MFF	Mixed Fleet Flying
MTO	Maximum Take-Off Thrust
MTOW	Maximum Take-off Weight
NNP	Non Normal Procedure
NSEP	National Simulator Evaluation Program
ODR	Operator Differences Requirements
OE	Operational Evaluation
OEB	Operational Evaluation Board
OEI	One Engine Inoperative
OVSP TEST	Overspeed Test
OET	Operation Evaluation Team
PAPI	Precision Approach Path Indicator
PBC	Performance-based Communications
PBCS	Performance-based Communications and Surveillance
PBN	Performance-based Navigation
PBS	Performance-based Surveillance
PFD	Primary Flight Display
PIC	Pilot-In-Command
PF	Pilot Flying
PM	Pilot Monitoring
PNF	Pilot Not Flying
POI	Principal Operations Inspectors
PORD	Private Operator registration Document
PPC	Pilot Proficiency Check
PTR	Pilot Type Rating
RA	Resolution Advisory
RAAS	Runway Awareness Advisory System
RF	Radius to Fix
RNP	Remote Navigation Performance

RNP AR	Required Navigation Performance Authorization Required
RTU	Radio Tuning Unit
QRH	Quick Reference Handbook
SA	Special authorization/Specific Approval
SBAS	Satellite-Based Augmentation system
SB	Service Bulletin
SIC	Second in Command
SI	Systems Integration
S/N	Serial Number
SID	Standard Instrument Departure
SOP	Standard Operating Procedures
SR/SL	Smart Runway/Smart landing
STAR	Standard Terminal Arrival
STC	Supplemental Type Certificate
SVS	Synthetic Vision system
TASE	Training Area of Special Emphasis
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Alert and Collision System
TCCA	Transport Canada Civil Aviation
TCDS	Type Certificate Data Sheet
TDZE	Touch Down Zone Elevation
TOGA	Take-Off Go-Around
TOLD	Take Off and Landing Data
URA	Unreliable Airspeed
VASIS	Visual Approach Slope Indicator
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
WAAS	Wide Area Augmentation System

6. Definitions

These definitions are for the purposes of this report only.

1) **Base aircraft** - An aircraft identified for use as a reference to compare differences with another aircraft.

2) **Current** – A crewmember meets all requirements to operate the aircraft under the applicable CARs or CASS.

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 flight crewmembers. Difference levels range from A to E.

4) **Master differences requirements (MDR)** – Specifies the highest training and checking difference levels between a pair of related aircraft derived from the Differences Tables.

5) **Mixed fleet flying (MFF)** – 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) **Operational evaluation (OE)** – The evaluation of manufactured or modified aircraft by use of standard systems, processes, and tests necessary to determine pilot type rating, minimum crewmember training, checking and currency requirements, unique or special crewmember certification requirements and the operational suitability of the aircraft.

7) **Operational suitability** – A determination made during an operational evaluation that an aircraft or system may be used in an airspace system and meets the applicable operating regulations and requirements.

8) **Qualified** – A flight crewmember holds the appropriate licenses and ratings as required by the applicable operating regulations.

9) **Related aircraft** – Two or more aircraft of the same make with either the same or different type certificates that have been determined (by an operational evaluation process) to have commonality. (See Variant)

10) **Same type rating** - Term used to indicate that the flight crewmember type rating applies to one or more related aircraft. Differences training and checking may be required between related aircraft.

11) **Seat dependent tasks** – Manoeuvre or procedures using controls that are accessible or operable from only one flight crewmember seat.

12) **Specialty training** – Training on specific functionalities and capabilities that is outside the scope of initial, recurrent or differences type rating training.

13) **Specific flight characteristics** – A manoeuvre or procedure with unique handling or performance characteristics that TCCA has determined must be checked.

14) **Training Areas of Special Emphasis (TASE)** – A training requirement unique to the aircraft, based on a system, procedure, or manoeuvre, which requires additional highlighting during training. It may also require additional training time, specialized training devices or training equipment.

15) **Variant** – Synonym for Related aircraft. A variant is an aeroplane or a group of aeroplanes with the same characteristics that have pertinent differences from a base aeroplane. Pertinent differences are those that require different or additional flight crew member knowledge, skills and/or abilities that affect flight safety. (See Related aircraft)

7. Pilot type rating

The Transport Canada type certificate data sheet (TCDS) A-131 identifies the Challenger CL-600-2B16 as the 604 variant including the Challenger 605 and 650 as marketing designations.

For purpose of clarity, the terminology “CL-604”, “CL-605” and “CL-650” will be used in this report to distinguish between the CL-600-2B16 aircraft.

In accordance with Appendix A Aircraft Type Designator Tables of Standard 421 - Flight Crew Permits, Licenses and Ratings – *Canadian Aviation Regulations* (CARs), the pilot type rating for the CL-600-2B16 is CL64.

Note:

Refer to section 4.7.9 of this report which outlines the historical summary of the Bombardier Challenger Aircraft with the serial numbers applicable to each model.

8. Related aircraft

8.1 Related aircraft on same TCDS

The CL-600-2B-16 (Type Designator CL64) is on the same TCDS No. A-131 as the CL-600, CL-601-1A, CL-601-3A and CL-601-3R (Type Designator CL60).

No type rating credits have been established between the Challenger CL64 and CL60 aircraft types.

Note:

An operational evaluation is required in accordance with the guidance material in section 4.2 of this report to determine and establish training, checking and currency credits between the CL64 and CL60 aircraft types.

8.2 Related aircraft on different TCDS

The CL65 models found on TCDS No. A-276, were previously recorded on TCDS No. A-131. No type rating credits have been established between the Challenger CL64 and CL65 aircraft types.

Note:

An operational evaluation is required in accordance with the guidance material in section 4.2 of this report to determine and establish training, checking and currency credits between the CL64 and CL65 aircraft types.

9. Pilot training

9.1 Previous experience

Pilots assigned to initial CL64 training will benefit from previous operational experience in large multi-engine transport category turbojet aircraft operated under CARs subparts 704, 705 and 604, and in swept wing turbojet aeroplanes having highly integrated avionics systems, automatic flight control systems (AFCS), head-up display (HUD), electronic flight bag (EFB), flight management system (FMS), auto-throttle and operated at high altitudes. Operators may need to provide additional training to pilot candidates that do not have this this type of experience.

9.2 Challenger CL64 initial type rating course

The air operator initial type rating course should meet the training requirements of CASS 724.115 (10.1) Level “C” training program. The minimum initial training times are those of CASS 724.115 (31) Level “C”, providing the average pilot with the knowledge, skill, and proficiency to satisfy the type rating requirements of Standard 421.40(3) (a) (iii), and the PPC requirements of CASS 724.108(1).

CARs subpart 604 private operator training requirements should be in accordance with CARs 604.166 and the required practices, processes and procedures outlined in their operator’s operations manual and CARs 604.143 competency check requirements.

9.3 Challenger CL64 initial type rating course approach minimums

The CL64 Initial type training was performed to CAT I approach minimums and standard take-off minima. The additional training required to qualify operators for a Special Authorization/Specific Approval (SA) for take-off minima reported visibility RVR 1200 feet, RVR 600 Feet and CAT II was not evaluated under the scope of the OE.

9.4 Recurrent training

In addition to the applicable regulatory requirements applicable to CARs subparts 704 and 604, air operators and private operators must incorporate any CL64 specific recurrent (annual) training requirements provided in this report. An air operator’s CL64 recurrent training must meet CASS 724.115 (31) minimum training times.

9.5 Training Areas of Special Emphasis (TASE)

Several aircraft systems and/or procedures must receive special emphasis in CL64 training programs. Pilots must receive special emphasis training during ground, systems integration, and flight training on flight simulator training devices (FSTDs) that are identified in this report.

9.5.1 Training Areas of Special Emphasis

TASE must be provided in the following areas during ground initial, recurrent, and upgrade training:

1) flight control panel (FCP);
2) flight mode annunciator (FMA);
3) air data reference panel (ADRP) or cursor control panel (CCP) (as applicable);
4) integrated flight information system (IFIS) (when installed);
5) display control panel (DCP);
6) flight management system (FMS);
7) unreliable airspeed (URA) non-normal procedure; and
8) any additional requirements in the attached appendices

9.5.2 TASE flight training

Special emphasis training during initial flight training must be provided in the following areas:

1) dual hydraulic system malfunctions (system 1 or 2 and system 3);
2) roll control during dual hydraulic system failure, including crosswind landing and rollout;
3) air-driven generator (ADG) deployment;
4) instrument landing system (ILS) approach on standby instruments (integrated standby instrument (ISI) only);
5) primary flight display (PFD), multifunction display (MFD), and engine indicating and crew alerting system (EICAS) status page reversionary modes;
6) inability to exclusively use EICAS messages to determine aircraft system status. Some switches (i.e., L/R to aux fuel transfer, fuel crossflow, and alternating current essential bus transfer) are not represented by EICAS messages;
7) operations with inoperative auto-throttle (when installed);
8) flight control system jam procedures;
9) unreliable airspeed (URA) non-normal procedure; and
10) any additional requirements in the attached appendices.

9.5.3 TASE unreliable airspeed

In March 2018 a CL64 aircraft was involved in a fatal accident. The Aircraft Accident Investigation Board Report included one of the causes to be insufficient operational prerequisites for the management of erratic airspeed indication failure by the cockpit crew. One of the findings from the report indicated that both pilots had been trained about abnormal and

emergency procedures in approved training organizations and passed recurrent training, but evidence of the accident flight showed that the training was not effective in airspeed indication failure and unreliable airspeed appears to be poorly understood and trained. One of the safety recommendations from the report is to ensure that aircraft operators will improve unreliable airspeed training for pilots.

Bombardier has implemented a significantly modified unreliable airspeed (URA) non-normal AFM procedure. This procedure was evaluated by TCCA Flight Test and found to be effective and safe. TCCA Flight Test has also recommended that inclusion of the URA non-normal procedure (NNP) be included in CL64 initial and recurrent training.

An operational evaluation of the proposed CL64 URA NNP initial and recurrent training was conducted at CAE Montreal in September 2023 and found to be acceptable. The training included:

1) Initial and recurrent ILT training consisting of:
    a) a review of the CL64 accident investigation which led to the implementation of URA training;
    b) unreliable airspeed indications (possible EICAS messages and flight instrument indications);
    c) review of applicable checklists and limitations; and
    d) emphasis on crew resource management (CRM) to ensure a successful outcome.
2) Initial and recurrent simulator training consisting of:
    a) single and dual unreliable airspeed scenarios;
    Note: Only dual malfunction recommended during recurrent training.
    b) variation of system failures leading to URA (ADC fail and/or pitot-static blockage)
    Note: There is insufficient flight test and in-service data to support the use of a dual pitot-only blockage scenario in the simulator; and
    c) real-time scenarios carried out to completion (approach and landing).

At the completion of CAE's URA NNP training, a T3 was conducted and completed successfully. Due to the multiple URA NNP training recommendations and the complex nature of URA recognition and checklist procedures, it has been included as a Training Area of Special Emphasis.

9.6 Specific flight characteristics

Special emphasis during initial and upgrade training must be placed on the roll control during multiple hydraulic system failure, crosswind landing and rollout, and zero-flap landing.

9.6.1 Flight training on Level C or D flight simulator and/or aircraft

The OEB has determined that no-flap approaches and landings to a full stop are required to be demonstrated by applicants seeking initial and upgrade training in this aircraft. The aircraft has a relatively high approach and landing speed and tends to "float" if normal landing flare technique is used in this situation. Thrust reverser deployment during a no-flap landing tends to cause the nose to pitch-up, requiring significant pilot input to maintain nose wheel contact with the runway.

9.7 Seat dependent tasks

Pilots must receive training in these seat dependent tasks in the seat they are assigned to:

1) nose wheel steering tiller usage (left seat) for initial, recurrent, and upgrade;
2) HUD (left seat) for initial, recurrent, and upgrade; and
3) passenger oxygen (right seat) for initial and recurrent.

9.8 Regulatory training requirements

Reserved

9.9 Flight Simulation Training Devices (FSTD)

The acceptability of differences between devices, simulators, and aircraft must be addressed by the POI. Requests for device approval should be made to the POI. The POI may approve those devices for that operator if their characteristics clearly meet the established TC criteria and have been qualified by the National Simulator Evaluation Program (NSEP). Device and simulator characteristics are designated in Aeroplane and Rotorcraft Simulator Manual (TP 9685).

It is the operator's responsibility to ensure the training and checking scripts are developed using an approved airport scene. The Approved FFS Statement of Qualification (FAA) and Qualification Renewal Certificate for (TCCA) normally have a list of approved airport scenes.

9.10 Systems integration training flight training device

A Level 5 FTD or higher is required for aircraft systems integration training.

9.11 Full flight simulator

A minimum Level C or D FFS is required for flight training conducted in an FFS. The HUD must be trained with the noted FFS levels with day and night conditions.

9.12 Training equipment

There are no specific systems or procedures that are unique to all variants of the CL64 that require specific training equipment.

9.13 Differences training between related aircraft

Pilots assigned to operate multiple variants of the CL64 must receive differences training between the Challenger 604, Challenger 605, Challenger 605(SB), and Challenger 650. The level of training is specified in Appendix 3.

10. Pilot checking

Aircraft knowledge tests should be conducted prior to any proficiency checks. Any limitations and immediate actions that must be committed to memory should be evaluated by closed book examination for all initial and recurrent training. Aircraft systems and operational knowledge should be evaluated by open book questions corrected to 100%.

Note:

The TCCA OE team followed the CARs 704 SCHEDULE I - Pilot Proficiency Check (PPC) and the additional checking items identified in this report.

CARs 604 competency checks (CC) should be conducted in accordance with the Flight Test Guide, Private Operators Competency Check and the additional checking items identified in this report.

10.1 No-flap approach and landing

The probability of flap extension failure on the CL64 is not extremely remote due to system design. Therefore, demonstration of a no-flap approach and landing during the initial Pilot Proficiency Check or Competency Check is required.

10.2 Specific flight characteristics

There are no specific flight characteristics.

10.3 Seat dependent tasks – initial and recurrent PPC or CC

Pilots must be checked on these seat dependent tasks:

1) nose wheel steering tiller usage (left seat) for initial, recurrent, and upgrade; and
2) HUD (left seat) for initial, recurrent, and upgrade.

10.4 HUD equipped CL64

The following must be checked on HUD equipped CL64 checking for initial, recurrent, and upgrade PPC or CC:

1) take-off without the use of HUD;
2) IFR approach; and
3) landing.

10.5 Flight Simulation Training Devices (FSTD)

There are no specific systems, procedures, or manoeuvres that are unique to the CL64 that require a specific FSTD for checking.

10.6 Equipment

There are no specific systems or procedures that are unique to the CL64 that require specific equipment.

10.7 Differences checking between related aircraft

Pilots assigned to operate multiple models of the CL64 (Challenger 604, Challenger 605, Challenger 605(SB), and Challenger 650) may require additional checking requirements. Refer to the attached appendices for guidance.

11. Pilot currency

There are no additional currency requirements for the CL64 other than those already required under CARs Subpart 604 or CARs Subpart 704 and as indicated in the following for operators that hold the itemised operational privileges:

1) HUD Approaches – see Appendix 5,
2) RNP AR Approaches – see Appendix 8 and
3) Steep Approaches – see Appendix 9.

11.1 Differences currency between related aircraft

For pilots assigned to operate multiple variants of the CL64 (Challenger 604, Challenger 605, Challenger 605(SB), and Challenger 650) additional currency requirements are outlined in the attached appendices.

12. Operational suitability

12.1 General

The operational evaluation determined the CL64 is operationally suitable for operations conducted in accordance with CARs Subpart 704 and CARs Subpart 604.

Note:

Appendices listed in this report serve to ascertain subsequent operation evaluations that assessed the capability of evaluated systems as operationally suitable.

12.2 Passenger cabin

The CL64 is certified without passenger provisions. Each interior configuration requires an evaluation by the TCCA authority responsible for the Air Operator Certificate (AOC) (CARs Subpart 704) or Private Operator Registration Document (PORD) (CARs Subpart 604) as applicable. Operators should consult their TCCA approving authority early in the planning stages to ensure their specific interior does not introduce any elements that would jeopardize the CARs Subparts 704/604 compliance requirements.

12.3 Performance

Air operators must demonstrate compliance with CARs Subpart 704, Division IV requirements, prior to TCCA approval for operations. The air operator's ability to effectively plan turning departures in areas of high terrain or obstacles will be assessed as part of the approval process. Guidance is provided in the most recent revision of TCCA AC 700-016.

13. Miscellaneous

13.1 Optional equipment

Operator specific items have not been evaluated. Operators should note that the CL64 has a wide range of optional equipment which affects both flight deck and cabin standards which may require additional flight crew training. Optional systems outline training requirements to be included in the TCCA approved training program for initial, recurrent, and upgrade.

13.2 Flight deck observer seat

The CL64 forward observer seat as installed by STC SA02355NY-T, STC ST02502CH, STC ST04397CH, and STC ST02543CH-D has been evaluated and determined to meet the requirements of FAR 135.75(b) and FAA AC 120-83, Flight Deck Observer Seat and Associated Equipment. TCCA accepts the findings of the FAA.

13.3 Crew rest facility

Not Applicable

13.4 Aircraft approach category and circling minima:

The CL64 is considered category “C” aircraft for the purposes of determining straight-in landing weather minima. This approach category is determined by the maximum certified landing weight approach speed in the Flaps 45 landing configuration.

Circling approaches for the CL64 are flown with the landing gear down, Flaps 30, and Vref + 10 kts. The approach category and associated approach minima will be determined by the approach/circling speed flown and shall not be less than category “C” speed on a circling approach.

13.5 Normal final approach flap setting

The normal final approach flap settings for the CL64 is Flaps 45.

14. References

1) FAA Flight Standardization Board (FSB) for the Bombardier Challenger FSB-CL604-605-650 Rev 7 or latest revision at http://drs.faa.gov ;

2) FAA Advisory Circular AC120-53B, Change 1, Guidance for Conduction and Use of Flight Standardization Board Evaluations, dated October 24, 2016;

3) JOEB OPS/FCL Common Procedures for Conducting Operational Evaluation Boards, dated June 10, 2004;

4) TCCA Type Certificate Data Sheet A-131, Issue No 62, dated September 14, 2022, or latest revision;

5) TCCA AC 700-016 Compliance with Regulations and Standards for Engine-Inoperative Obstacle Avoidance; Issue 01, dated 2010-02-05 or latest revision;

6) FAA Operational suitability Report (OSR) Operational credit for Enhanced Flight Vision System (EFVS) Rev 3 dated August 14, 2020 or later revision;

7) TCCA Special Condition – Airworthiness https://tc.canada.ca/en/aviation/aircraft-airworthiness/aircraft-certification/list-approved-special-condition-airworthiness-sca ;

8) TCCA Exemptions https://tc.canada.ca/en/aviation/aircraft-airworthiness/aircraft-certification/aircraft-certification-standards-exemptions.

Appendix 1 – Difference legends

Training differences legend

Differences level	Type	Training method examples	Conditions
A	Hand Out (HO)	• Operating manual revision (HO) • Flight crew operating bulletin (HO)	• 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	• Audio visual presentation (AV) • Tutorial computer based instruction (TCBI) • Instructor Led Training (ILT) • Video Tapes (VT)	• Systems are functionally similar. • Crew understanding required. • Issues need emphasis. • Standard methods of presentation required.
C	Systems Devices	• Interactive (full-task) computer based training (ICBT) • Cockpit System Simulator (CSS) • Cockpit procedures trainers (CPT) • Part task trainers (PTT) • Level 4 - 5 flight training device (FTD 4-5)	• 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	Manoeuvres Devices	• Level 6 or 7 flight training device (FTD 6-7) • Level A or B full flight simulator (FFS A-B)	• Training can only be accomplished in flight manoeuvre 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	• Level C or D full flight simulator (FFS C-D) • Aircraft (ACFT)	• 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.

Notes:

1. An “X” in a Differences table column indicates that any of the training methods listed for that level are acceptable. If a specific instruction method is specified in a Differences Table column, it must be used.

2. In accordance with Common Procedures Document for Operational Evaluation Board (OEB) FAA -JAA –TCCA, a “B” in the Checking column of the Differences tables indicates a “task” or “systems” check is required. A “C” in the checking column indicates a partial proficiency check is required.

Checking differences legend

Differences level	Checking method examples	Conditions
A	None	None
B	• Oral or written exam • Tutorial computer-based instruction (TCBI)	• Individual systems or related groups of systems.
C	• 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)	• Checking can only be accomplished using systems devices. • Checking objectives focus on mastering individual systems, procedures, or tasks.
D	• Level 6 or 7 flight training device (FTD 6-7) • Level A or B full flight simulator (FFS A-B)	• 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	• Level C or D full flight simulator (FFS C-D) • Aircraft (ACFT)	• Significant full task differences that require a high fidelity environment.

Currency differences legend

Differences level	Currency method examples	Conditions
A	• Not Applicable	• Currency common to each variant • Assessment or tracking currency of separate variants not required.
B	• Self Review	• Knowledge related currency • Self-review on crewmember's initiative of specific review material provided by the operator. • Operator provides specific review material that must be reviewed to regain currency, if that variant has not been flown within a specified period (e.g. 90 days)
C	• Designated System	• Skill and knowledge related currency • Applicable to one or more designated systems or procedures (e.g. FMS, Flight Guidance etc.) • Variant with designated system must be flown within 90 days or as specified to maintain currency • Currency, when lost is re-established by completing required items using a device equal or higher than specified for Level C differences training and checking. • Other means to re-establish currency include supervised flights, or completion of proficiency training and check
D	• Designated Manoeuvre	• Knowledge and skills required to perform aircraft control tasks in real time with integrated use of systems and procedures. • Level D currency may address certain specific differences • Crewmember flies selected manoeuvres on variant using a particular system (e.g. Flight Guidance or Instrument Display system), sufficiently often to retain familiarity and competence within the specified currency period • Currency, when lost is re-established by completing pertinent manoeuvres using a device equal or higher than specified for Level D differences training and checking. • Other means to re-establish currency include supervised flights, or completion of proficiency training and check.

Differences level	Currency method examples	Conditions
E	• Takeoffs and landings or other manoeuvres in a Level C or D FFS, or on aircraft within 90 days or other regulatory requirements	• Level C or D full flight simulator (FFS C or D) or aircraft • Level E currency may specify other system, procedure or manoeuvre currency items that must be used in conjunction with satisfying takeoff and landing requirements. • Credit may be permitted for takeoffs and landings in any variant with common flight characteristics. • Assignment of Level E currency does not result in assignment of separate type rating. (Applies only to Level E training differences) • Currency, when lost is re-established by completing pertinent manoeuvres using a device specified for Level E differences training and checking. • Other means to re-establish currency include supervised flights, or completion of proficiency training and check.

Appendix 2 – Master differences requirements table

Pilot Type Rating CL64		FROM AIRPLANE		
		CL-604	CL-605	CL-605(SB) /CL-650
TO AIRPLANE	CL-604	NA	C/B/A	C/B/A
	CL-605	C/B/A	NA	B/B/A
	CL-605(SB) /CL-650	C/B/B	B/B/B	NA

CL-605 refers to the basic CL-605 which does not have any of avionics upgrade Service Bulletins (SBs) installed as listed in Appendix 7.

CL-605(SB) refers to a CL-605 aircraft with at least one to all of the avionics upgrade SBs installed as listed in Appendix 7.

CL-650 incorporates all of the avionics upgrade SBs as listed in Appendix 7 in a newly manufactured aircraft Serial No. 6050 and subsequent.

Note:

RNP AR training, checking, and currency requirements are addressed in Appendix 3, Annex H. More information can be found in Appendix 8.

Appendix 3 – Differences tables

Annex A – Table of contents

From Base Aircraft	To Related Aircraft	Annex	Page
CL-604	CL-605	B	38
CL-605	CL-604	C	42
CL-604	CL-605(SB)/650	D	46
CL-605(SB)/650	CL-604	E	51
CL-605	CL-605(SB)/650	F	56
CL-605(SB)/650	CL-605	G	61
CL-605(SB)/650 No RNP AR	CL-605(SB)/650 With RNP AR	H	63
CL-650	CL-650 MTO/FLEX	I	64

Annex B – Differences tables: Challenger 604 to Challenger 605

DIFFERENCE AIRCRAFT: CL-600-2B16 (605) BASE AIRCRAFT: CL-600-2B16 (604) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
DESIGN	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
Air Gen	Passenger cabin windows increased in size and raised. Over wing emergency exit raised.	No	No	X				A	A
Air Gen	Aerodynamic tail cone redesigned	No	No	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (605) BASE AIRCRAFT: CL-600-2B16 (604) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
21 Air conditioning & pressurization	Thermostatically controlled pilot and co-pilot heated floor mats installed	No	No	X				A	A
21 Air conditioning & pressurization	Footwarmers and windshield heater and fan deleted. Copilot Demist handle and CKPT HEAT switch on air conditioning panel removed	No	No	X				A	A
21 Air conditioning & pressurization	2nd CPAM installed, standby cabin altitude indicator removed	No	Minor	X				A	A
21 Air conditioning & pressurization	Cabin temperature control transfer switch (CABIN TEMP CONT XFER) added to air conditioning control panel	No	Minor	X				A	A
22 Auto Flight	Auto-throttle is standard equipment	No	Minor		X			A	A
22 Auto Flight	Auto-throttle control panel and switches installed on left glareshield	No	Minor		X			A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (605) BASE AIRCRAFT: CL-600-2B16 (604) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
23 Comm	Radio Tuning Units (RTU) removed, tuning functions performed by CCP/MFD	No	Minor		X			A	A
24 Electrical Power	AC utility switch/light added to Electrical Power panel	No	Minor	X				A	A
24 Electrical Power	Minor changes in electrical power distribution	No	Minor	X				A	A
27 Stall Protection	STALL annunciators removed from glareshield, replaced by STALL indications on PFD	No	Minor	X				A	A
31 Indicating and Recording	ProLine 21 replaces ProLine 4 6 displays replaced by 4 large (10 X 12) displays Air Data Reference Panel (ARP), Display Control Panel (DCP), Weather Radar Control Panel (WXP), EICAS Control Panel (ECP) removed, replaced by Display Control Panel (DCP) (On-side PFD) and Cursor Control Panel (CCP) (On-side MFD). Industry standard colour convention adopted	No	Major			X		B	A
31 Indicating and Recording	EICAS - CAS messages combined into single stack, same stacking philosophy.	No	No	X				A	A
31 Indicating and Recording	EFIS - Advisory AOA indicator available on each PFD	No	No	X				A	A
31 Indicating and Recording	APU temperature and RPM display on MFD is different in format.	No	No	X				A	A
31 Indicating and Recording	Capable of supporting optional: Enhanced map displays, XM/Universal weather display, etc.	(*)	(*)	(*)				(*)	(*)
31 Indicating and Recording	Over speed test (OVSP TEST) switch removed, No preflight over speed test required.	No	Minor	X				A	A
31 Indicating and Recording	EICAS – Single warning/caution switch/light on glareshield (one per side)	No	No	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (605) BASE AIRCRAFT: CL-600-2B16 (604) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
31 Indicating and Recording	Standby instruments, Electro-pneumatic standby Altitude/Airspeed and Attitude instruments replaced by an integrated standby instrument (ISI)	No	Minor	X				A	A
31 Indicating and Recording	Electronic clocks (2) replaced with a single GPS-capable clock	No	No	X				A	A
33 Lighting	Circuit breaker and integral cockpit panel lighting and some switch/lights changed to LEDs	No	No	X				A	A
33 Lighting	Pulsating landing lights are standard equipment	No	No	X				A	A
34 Navigation	Baro knob functionality modified	No	Minor	X				A	A
34 Navigation	IRS system capable of in-flight nav alignment	No	Minor	X				A	A
34 Navigation	FMS CDU. Smaller CDU- 6200 installed. Alpha-numeric key layout differs	No	No	X				A	A
34 Navigation	FMS Color convention modified	No	No	X				A	A
34 Navigation	TAWS altitude callouts available for both DH and MDA	No	Minor	X				A	A
49 APU	APU Honeywell 36-150 is standard.	No	Minor	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (605) BASE AIRCRAFT: CL-600-2B16 (604) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
MANEUVER	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
n/a	nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

(*) Enhanced map displays, XM/Universal weather display, etc. is a customer option and was not evaluated by the OEB.

Annex C – Differences tables: Challenger 605 to Challenger 604

DIFFERENCE AIRCRAFT CL-600-2B16 (604) BASE AIRCRAFT: CL-600-2B16 (605) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
DESIGN	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
Air Gen	Passenger cabin windows are smaller in size and situated lower. Over wing emergency exit is situated lower.	No	No	X				A	A
Air Gen	Different aerodynamic tail cone	No	No	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (604) BASE AIRCRAFT: CL-600-2B16 (605) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
21.Air conditioning & pressurization	No thermostatically controlled pilot and co-pilot heated floor mats installed	No	No	X				A	A
21.Air conditioning & pressurization	Forced air foot-warming and windshield demist provided. Fan and electric heater controlled by CKPT HEAT switch on Air conditioning panel Full foot warmer/full windshield vent control knob installed on copilot side panel removed	No	No	X				A	A
21.Air conditioning & pressurization	Single CPAM installed, standby cabin altitude indicator provided beneath glareshield.	No	Minor	X				A	A
21.Air conditioning & pressurization	No cabin temperature control transfer switch on air conditioning control panel	No	Minor	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (604) BASE AIRCRAFT: CL-600-2B16 (605) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
22 Auto Flight	Auto-throttle is optional equipment	No	Minor	X				A	A
22 Auto Flight	Autopilot mistrim icons appear on PFD.	No	Minor	X				A	A
23 Comm	Radio tuning functions performed at Radio Tuning Units (RTU) vice CCP/MFD	No	Minor		X			A	A
24Electrical Power	No AC utility switch/light on Electrical Power panel	No	Minor	X				A	A
24 Electrical Power	Minor changes in electrical power distribution.	No	Minor	X				A	A
27.Stall Protection	STALL annunciators on left and right glareshield, vice PFD	No	Minor	X				A	A
31.Indicating and Recording	ProLine 4 avionics suite installed vice ProLine 21. Four (4) displays replaced by six (6) smaller displays Air Data Reference Panel (ARP), Display Control Panel (DCP), Weather Radar Control Panel (WXP), EICAS Control Panel (ECP) installed, vice Cursor Control Panel (CCP)	No	Major			X		B	A
31.Indicating and Recording	EICAS - CAS messages displayed on two EICAS Displays same stacking philosophy although two stacks. Some color philosophy changed	No	No	X				A	A
31.Indicating and Recording	EFIS – No Advisory AOA indicator on PFDs	No	No	X				A	A
31.Indicating and Recording	Over speed test (OVSP TEST) switch installed to facilitate testing during preflight.	No	Minor	X				A	A
31.Indicating and Recording	EICAS – Separate warning/caution switch/lights on glareshield (one warning and one caution per side)	No	No	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (604) BASE AIRCRAFT: CL-600-2B16 (605) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
31 Indicating and Recording	APU temperature and RPM display on MFD is different in format.	No	No	X				A	A
31 Indicating and Recording	Standby instruments, Electro-pneumatic standby Altitude/Airspeed and Attitude instruments installed	No	Minor	X				A	A
31.Indicating and Recording	Two (2) Electronic clocks installed no GPS interface.	No	No	X				A	A
33 Lighting	Circuit breaker and integral cockpit panel lighting and switch/lights are incandescent	No	No	X				A	A
33 Lighting	Pulsating landing lights available as optional equipment only.	No	No	X				A	A
34 Navigation	Baro knob functionality and location differs	No	Minor	X				A	A
34 Navigation	IRS system not capable of in-flight nav alignment	No	Minor	X				A	A
34 Navigation	FMS Color convention non industry standard	No	No	X				A	A
34 Navigation	FMS CDU. Larger CDU- 6000 installed. Alpha-numeric key layout differs	No	No	X				A	A
34 Navigation	TAWS altitude callouts available for radio altitude (DH) only	No	Minor	X				A	A
34 Navigation	Radio Altitude, pilot initiated test function provided.	No	Minor	X				A	A
49 APU	APU GTCP-36-100E is standard.	No	Minor	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (604) BASE AIRCRAFT: CL-600-2B16 (605) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
MANEUVER	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
n/a	Nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Annex D – Differences tables: Challenger 604 to Challenger CL-605(SB)/650

Note: This table represents training, checking, and currency requirements for upgrading from a CL-604 to either a CL-605 with Avionics Upgrade Service Bulletins installed (CL-605(SB)) or a CL-650. An asterisk (*) represents an upgraded or added service bulletin component to the CL-605.

DIFFERENCE AIRCRAFT CL-605(SB)/CL-650 BASE AIRCRAFT: CL-604 APPROVED BY (POI)_____				**COMPLIANCE METHOD**					
				TRAINING				**CHKG/CURR**	
DESIGN	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
Air Gen	Passenger cabin windows increased in size and raised. Over wing emergency exit raised.	No	No	X				A	A
Air Gen	Aerodynamic tail cone redesigned	No	No	X				A	A

DIFFERENCE AIRCRAFT CL-605(SB)/CL-650 BASE AIRCRAFT: CL- 604 APPROVED BY (POI)_____				**COMPLIANCE METHOD**					
				TRAINING				**CHKG/CURR**	
SYSTEM	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
21 Air conditioning & pressurization	Thermostatically controlled pilot and co-pilot heated floor mats installed	No	No	X				A	A
21 Air conditioning & pressurization	Footwarmers and windshield heater and fan deleted. Copilot Demist handle and CKPT HEAT switch on air conditioning panel removed	No	No	X				A	A
21 Air conditioning & pressurization	2nd CPAM installed, standby cabin altitude indicator removed.	No	Minor	X				A	A

DIFFERENCE AIRCRAFT CL-605(SB)/CL-650 BASE AIRCRAFT: CL- 604 APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
21 Air conditioning & pressurization	Cabin temperature control transfer switch (CABIN TEMP CONT XFER) added to air conditioning control panel	No	Minor	X				A	A
22 Auto Flight	Auto-throttle is standard equipment	No	Minor		X			A	A
22 Auto Flight	Auto-throttle control panel and switches installed on left glareshield	No	Minor		X			A	A
22 Auto Flight	Optional ½ bank not allowed in LNAV mode below 31,600 ft.	No	Minor		X			B	A
23 Comm	Radio Tuning Units (RTU) removed, tuning functions performed by CCP/MFD	No	Minor		X			A	A
23 Comm	Optional FANS 1A+ (CPDLC plus ADS-C) via FMS 6200 CDU.	No	Major		X			B	B
24 Electrical Power	AC utility switch/light added to Electrical Power panel and minor changes in electrical power distribution	No	Minor	X				A	A
27 Stall Protection	STALL annunciators removed from glareshield, replaced by STALL indications on PFD	No	Minor	X				A	A
31 Indicating and Recording	Pro Line 21 replaces Pro Line 4 6 displays replaced by 4 large (10 X 12) displays Air Data Reference Panel (ARP), Display Control Panel (DCP), Weather Radar Control Panel (WXP), EICAS Control Panel (ECP) removed, replaced by Display Control Panel (DCP) (On-side PFD) and Cursor Control Panel (CCP) (On-side MFD) Industry standard color convention for displays adopted.	No	Major			X		B	A
31 Indicating and Recording	EICAS - CAS messages combined into single stack, same stacking philosophy.	No	No	X				A	A

DIFFERENCE AIRCRAFT CL-605(SB)/CL-650 BASE AIRCRAFT: CL- 604 APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
31 Indicating and Recording	APU temperature and RPM display on MFD is different in format.	No	No	X				A	A
31 Indicating and Recording	EFIS - Advisory AOA indicator available on each PFD	No	No	X				A	A
31 Indicating and Recording	Optional Capable of supporting optional: Enhanced map displays, XM/Universal weather display, etc.	No	Minor		X			A	B
31 Indicating and Recording	Over speed test (OVSP TEST) switch removed, No preflight over speed test required.	No	Minor	X				A	A
31 Indicating and Recording	EICAS – Single warning/caution switch/light on glareshield (one per side)	No	No	X				A	A
31 Indicating and Recording	Standby instruments, Electro-pneumatic standby Altitude/Airspeed and Attitude instruments replaced by an integrated standby instrument (ISI)	No	Minor	X				A	A
31 Indicating and Recording	Electronic clocks (2) replaced with a single GPS-capable clock	No	No	X				A	A
31 Indicating/ Recording	Optional Synthetic Vision System (SVS) provides situational awareness (advisory) to the crew by adding 3D terrain and runway data superimposed on the PFDs. SVS is pilot selectable.	No	No		X			B	A
33 Lighting	Circuit breaker and integral cockpit panel lighting and some switch/lights changed to LEDs	No	No	X				A	A
33 Lighting	Pulsating landing lights are standard equipment	No	No	X				A	A
34 Navigation	Baro knob functionality and location is modified	No	Minor	X				A	A

DIFFERENCE AIRCRAFT CL-605(SB)/CL-650 BASE AIRCRAFT: CL- 604 APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
34 Navigation	Optional FMS 6200 new features • Auto Position Initialization • Vspeed out of Range messages • ALD operation with contaminated runway • Remote (DBU-Initiated) Database Dataload • Manual Landing Factor • Airway to Airway Transitions	No	Norm		X			A	B
34 Navigation	IRS system capable of in-flight navigation alignment	No	Minor	X				A	A
34 Navigation	FMS CDU. Smaller CDU- 6200 installed. Alpha-numeric key layout differs.	No	Minor	X				A	A
34 Navigation	FMS Color convention on PFD differs	No	No	X				A	A
34 Navigation	TAWS altitude callouts available for both DH and MDA	No	Minor	X				A	A
34 Navigation	Optional RNP AR APCH >0.3 capable. [Specialty training required]	Yes	Norm	See Appendix 8 of this report					
34 Navigation	Optional Traffic Surveillance System TSS-4100 (TCAS/Transponder) installed.	No	Minor	X				A	A
34 Navigation	Provides future growth for ADS-B Out and ADS B – In. (not evaluated)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34 Navigation	Optional SBAS Localizer Performance with Vertical Guidance (LPV) 0.3 approach with RF legs capable.	No	Minor		X			A	B
34 Navigation	Optional SmartRunway and SmartLanding	No	Major		X			B	B
34 Navigation	Optional Multi-Scan weather radar with turbulence detection	No	Minor		X			A	B

DIFFERENCE AIRCRAFT CL-605(SB)/CL-650 BASE AIRCRAFT: CL- 604 APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
	Controlled at DCPs and Multiscan™ Radar Menu and annunciations Enhanced ground clutter suppression, allowing usable weather detection on ranges up to 320 nm. Provisions for predictive windshear detection growth.								
46 Information Systems	Optional Integrated Flight Information System (IFIS) Version 7.0 upgrade. Enhances electronic charts display and satellite graphical weather: - new XM weather capabilities for Canada and Puerto Rico. - Enroute charts All new capabilities are available via commercial subscription service.	No	Minor	X				A	A
49 APU	APU Honeywell 36-150 is standard.	No	Minor	X				A	A

DIFFERENCE AIRCRAFT CL- (605(SB)/CL-650 BASE AIRCRAFT: CL-604 APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
MANOEUVRE	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
n/a	Nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Annex E – Differences tables: Challenger CL-605(SB)/650 to Challenger 604

Note: This table represents training, checking, and currency requirements when transitioning from either a CL-605 with Avionics Upgrade Service Bulletins installed (CL-605(SB)) or a CL-650, to a CL-604.

DIFFERENCE AIRCRAFT CL-600-2B16 (604) BASE AIRCRAFT: CL-600-2B16 (605(SB)/650) APPROVED BY (POI)_____				**COMPLIANCE METHOD**					
				TRAINING				**CHKG/CURR**	
DESIGN	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
Air Gen	Passenger cabin windows are smaller in size and situated lower. Over wing emergency exit is situated lower.	No	No	X				A	A
Air Gen	Different aerodynamic tail cone	No	No	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (604) BASE AIRCRAFT: CL-600-2B16 (605(SB)/650) APPROVED BY (POI)_____				**COMPLIANCE METHOD**					
				TRAINING				**CHKG/CURR**	
SYSTEM	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
21.Air conditioning & pressurization	No thermostatically controlled pilot and co-pilot heated floor mats installed	No	No	X				A	A
21 Air conditioning & pressurization	Forced air foot-warming and windshield demist provided. Fan and electric heater controlled by CKPT HEAT switch on Air conditioning panel Full foot warmer/full windshield vent control knob installed on copilot side panel removed	No	No	X				A	A
21.Air conditioning & pressurization	Single CPAM installed, standby cabin altitude indicator provided beneath glareshield.	No	Minor	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (604) BASE AIRCRAFT: CL-600-2B16 (605(SB)/650) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
21.Air conditioning & pressurization	No cabin temperature control transfer switch on air conditioning control panel	No	Minor	X				A	A
22 Auto Flight	Auto-throttle is optional equipment	No	Minor	X				A	A
22 Auto Flight	Autopilot mistrim icons appear on PFD.	No	Minor	X				A	A
22 AFCS	½ bank allowed in LNAV mode below 31,600 ft.	No	Norm	X				A	A
23 Comm	Radio tuning functions performed at Radio Tuning Units (RTU) vice CCP/MFD	No	Minor		X			A	A
23 Comm	Challenger 604 FMS does not support: • FANS 1A+ (CPDLC plus ADS-C) ATN/LINKS 2000+ (future upgrade)	No	No	X				A	A
24.Electrical Power	No AC utility switch/light on Electrical Power panel and minor changes in electrical distribution.	No	Minor	X				A	A
27.Stall Protection	STALL annunciators on left and right glareshield, vice PFD	No	Minor	X				A	A
31 Indicating and Recording	Pro Line 4 avionics suite installed vice Pro Line 21. Four (4) displays replaced by six (6) smaller displays Air Data Reference Panel (ARP), Display Control Panel (DCP), Weather Radar Control Panel (WXP), EICAS Control Panel (ECP) installed, vice Cursor Control Panel (CCP) Non-standard FMS color conventions used for displays.	No	Major			X		B	A

DIFFERENCE AIRCRAFT CL-600-2B16 (604) BASE AIRCRAFT: CL-600-2B16 (605(SB)/650) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
31 Indicating and Recording	EICAS - CAS messages displayed on two EICAS Displays same stacking philosophy although two stacks.	No	No	X				A	A
31 Indicating and Recording	EFIS – No Advisory AOA indicator on PFDs	No	No	X				A	A
31 Indicating and Recording	Over speed test (OVSP TEST) switch installed to facilitate testing during preflight.	No	Minor	X				A	A
31 Indicating and Recording	EICAS –Separate warning/caution switch/lights on glareshield (one warning and one caution per side)	No	No	X				A	A
31 Indicating and Recording	APU temperature and RPM display on MFD is different in format.	No	No	X				A	A
31 Indicating and Recording	Standby instruments, Electro-pneumatic standby Altitude/Airspeed and Attitude instruments installed.	No	Minor	X				A	A
31 Indicating and Recording	Two (2) Electronic clocks installed no GPS interface.	No	No	X				A	A
31 Indicating/ Recording	No Synthetic Vision System (SVS).	No	No	X				A	A
33 Lighting	Circuit breaker and integral cockpit panel lighting and switch/lights are incandescent	No	No	X				A	A
33 Lighting	Pulsating landing lights available as optional equipment only.	No	No	X				A	A
34 Navigation	FMS 6000 in 604 does not support • Auto Position Initialization • Vspeed out of Range messages • ALD operation with contaminated runway • ETP/PNR • Remote (DBU-Initiated) Database Dataload • Manual Landing Factor	No	Norm		X			A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (604) BASE AIRCRAFT: CL-600-2B16 (605(SB)/650) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
	• Airway to Airway Transitions								
34 Navigation	Baro knob functionality and location differs	No	Minor	X				A	A
34 Navigation	IRS system not capable of in-flight nav alignment	No	Minor	X				A	A
34 Navigation	FMS CDU alpha-numeric key layout differs.	No	No	X				A	A
34 Navigation	FMS Color convention on PFD differs	No	No	X				A	A
34 Navigation	TAWS altitude callouts available for radio altitude (DH) only	No	Minor	X				A	A
34 Navigation	Challenger 604 is not RNP AR >0.3 capable.	No	No	X				A	A
34 Navigation	Challenger 604 is not SBAS Localizer Performance with Vertical Guidance (LPV) capable.	No	No	X				A	A
34 Navigation	No optional SmartRunway and SmartLanding	No	No	X				A	A
34 Navigation	Radio Altitude, pilot initiated test function provided.	No	Minor	X				A	A
34 Navigation	Weather radar is not Multi-Scan.	No	Minor	X				A	A
46 Information Systems	No Integrated Flight Information System (IFIS) capability.	No	No	X				A	A
49 APU	APU GTCP-36-100E is standard.	No	Minor	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (604) BASE AIRCRAFT: CL-600-2B16 (605(SB)/650) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
MANOEUVER	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
n/a	Nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Annex F – Differences tables: Challenger 605 to Challenger CL-605(SB)/650

Note: This table represents training, checking, and currency requirements when transitioning from a 605 without Avionics Upgrade Service Bulletins installed to a Challenger 605(SB) or 650.

DIFFERENCE AIRCRAFT: Avionics Upgrade (605(SB)/650) BASE AIRCRAFT: CL-600-2B16 (605) APPROVED BY (POI)_____				**COMPLIANCE METHOD**					
				TRAINING				**CHKG/CURR**	
DESIGN	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
n/a	Nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

DIFFERENCE AIRCRAFT: Avionics Upgrade (605(SB)/650)) BASE AIRCRAFT: CL-600-2B16 (605) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
22 Auto Flight	½ bank is not allowed in LNAV mode below 31,600 ft.	No	Minor		X			B	A
23 Comm	FANS–1A+ CPDLC and ADS-C controlled via FMS 6200 CDU ATN/Links 2000 + is optional	No	Norm		X			B	B
31 Indicating/ Recording	Synthetic Vision System (SVS) provides situational awareness (advisory) to the crew by adding 3D terrain and runway data superimposed on the PFDs. SVS is pilot selectable.	No	No		X			B	A
34 Navigation	Traffic Surveillance System TSS-4100 (TCAS/Transponder) installed. New TCAS audio " Level Off, Level Off" replaces "Adjust Vertical Speed".	No	Norm Abnorm	X				A	A
34 Navigation	SBAS Localizer Performance with Vertical Guidance (LPV) 0.3 approach with RF legs capable (not AR or SAAAR at this time) SBAS = WAAS and EGNOS Not Applicable if base 605 already has STC for WAAS LPV.	No	Norm		X			A	B
34 Navigation	FMS 6200 new features • Auto Position Initialization • Vspeed out of Range messages • ALD operation with contaminated runway • Remote (DBU-Initiated) Database Dataload • Manual Landing Factor • Airway to Airway Transitions	No	Norm		X			A	B
34 Navigation	Optional SmartRunway and SmartLanding	No	No		X			B	B
34 Navigation	Multi-Scan weather radar with turbulence detection Controlled at DCPs and Multiscan™ Radar Menu and annunciations	No	Norm		X			A	B

DIFFERENCE AIRCRAFT: Avionics Upgrade (605(SB)/650)) BASE AIRCRAFT: CL-600-2B16 (605) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
22 Auto Flight	½ bank is not allowed in LNAV mode below 31,600 ft.	No	Minor		X			B	A
23 Comm	FANS–1A+ CPDLC and ADS-C controlled via FMS 6200 CDU ATN/Links 2000 + is optional	No	Norm		X			B	B
31 Indicating/ Recording	Synthetic Vision System (SVS) provides situational awareness (advisory) to the crew by adding 3D terrain and runway data superimposed on the PFDs. SVS is pilot selectable.	No	No		X			B	A
34 Navigation	Traffic Surveillance System TSS-4100 (TCAS/Transponder) installed. New TCAS audio " Level Off, Level Off" replaces "Adjust Vertical Speed".	No	Norm Abnorm	X				A	A
34 Navigation	SBAS Localizer Performance with Vertical Guidance (LPV) 0.3 approach with RF legs capable (not AR or SAAAR at this time) SBAS = WAAS and EGNOS Not Applicable if base 605 already has STC for WAAS LPV.	No	Norm		X			A	B
34 Navigation	Optional 605*/650 RNP AR >0.3 capable. [Specialty training required]	Yes	Norm	See Appendix 8 of this report.					
46 Information Systems	Optional Integrated Flight Information System (IFIS) Version 7.2 upgrade. Enhances electronic charts display and satellite graphical weather: - new XM weather capabilities for Canada and Puerto Rico. - Enroute charts All new capabilities are available via commercial subscription service.	No	Norm		X			A	B

DIFFERENCE AIRCRAFT: Avionics Upgrade (605(SB)/650)) BASE AIRCRAFT: CL-600-2B16 (605) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
22 Auto Flight	½ bank is not allowed in LNAV mode below 31,600 ft.	No	Minor		X			B	A
23 Comm	FANS–1A+ CPDLC and ADS-C controlled via FMS 6200 CDU ATN/Links 2000 + is optional	No	Norm		X			B	B
31 Indicating/ Recording	Synthetic Vision System (SVS) provides situational awareness (advisory) to the crew by adding 3D terrain and runway data superimposed on the PFDs. SVS is pilot selectable.	No	No		X			B	A
34 Navigation	Traffic Surveillance System TSS-4100 (TCAS/Transponder) installed. New TCAS audio " Level Off, Level Off" replaces "Adjust Vertical Speed".	No	Norm Abnorm	X				A	A
34 Navigation	SBAS Localizer Performance with Vertical Guidance (LPV) 0.3 approach with RF legs capable (not AR or SAAAR at this time) SBAS = WAAS and EGNOS Not Applicable if base 605 already has STC for WAAS LPV.	No	Norm		X			A	B

DIFFERENCE AIRCRAFT CL- 605(SB)/CL-650 BASE AIRCRAFT: CL-605 APPROVED BY (POI)_____				**COMPLIANCE METHOD**					
				TRAINING				**CHKG/CURR**	
MANOEUVRE	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
n/a	Nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Annex G – Differences tables: Challenger 605(SB)/650 to Challenger 605

Note: This table represents training, checking, and currency requirements when transitioning from a CL-605(SB) or CL-650 to a CL-605 without Avionics Upgrade Service Bulletins installed.

DIFFERENCE AIRCRAFT: CL-600-2B16 (605) **BASE AIRCRAFT: Avionics Upgrade (605(SB)/650)** **APPROVED BY** **(POI)_____**				**COMPLIANCE METHOD**					
				TRAINING				**CHKG/CURR**	
DESIGN	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
n/a	Nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

DIFFERENCE AIRCRAFT: CL-600-2B16 (605) **BASE AIRCRAFT: Avionics Upgrade (605(SB)/650)** **APPROVED BY** **(POI)_____**				**COMPLIANCE METHOD**					
				TRAINING				**CHKG/CURR**	
SYSTEM	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**LVL A**	**LVL B**	**LVL C**	**LVL D**	**CHK**	**CURR**
22 Auto Flight	For basic 605 ½ bank is allowed in LNAV mode below 31,600 ft.	No	Minor		X			B	A
23 Comm	Basic 605 is not FANS–1A, CPDLC or ADS-C capable	No	Norm	X				A	A
31Indicating/ Recording	Basic 605 is not Synthetic Vision System capable	No	No	X				A	A
34 Navigation	Basic 605 FMS 6000 does not support • Auto Position Initialization • Vspeed out of Range messages • ALD operation with contaminated runway • ETP/PNR • Remote (DBU-Initiated) Database Dataload • Manual Landing Factor • Airway to Airway Transitions	No	Norm		X			A	A

DIFFERENCE AIRCRAFT: CL-600-2B16 (605) BASE AIRCRAFT: Avionics Upgrade (605(SB)/650) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
34 Navigation	Basic 605 does not support Traffic Surveillance System TSS-4100 (TCAS/Transponder) TCAS audio "Adjust Vertical Speed Adjust Vertical Speed" replaces "Level Off, Level Off"	No	Norm Abnorm	X				A	A
34 Navigation	Basic 605 is not SBAS capable. Localizer Performance with Vertical Guidance (LPV) 0.3 approach not available	No	Norm	X				A	A
34 Navigation	Basic 605 does not support SmartRunway and SmartLanding	No	No	X				A	A
34 Navigation	Basic 605 does not support Multi-Scan weather radar with turbulence Provisions and predictive windshear	No	Norm	X				A	A
34 Navigation	Basic 605 is not RNP AR > 0.3 capable.	--	--	X				A	A
46 Information Systems	Basic 605 does not have Integrated Flight Information System (IFIS) Version 7.2.	No	Norm	X				A	A

DIFFERENCE AIRCRAFT: CL-600-2B16 (605) BASE AIRCRAFT: Avionics Upgrade (605(SB)/650) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
Maneuver	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
n/a	Nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Annex H – Differences tables: Challenger 605(SB)/650 No RNP AR to Challenger 605(SB)/650 With RNP AR

DIFFERENCE AIRCRAFT (605(SB)/650) With RNP AR BASE AIRCRAFT: (605(SB)/650) No RNP AR APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
34 Navigation	Optional 605(SB)/650 RNP AR >0.3 capable. [Specialty training required]	Yes	Norm				X	D	D

Annex I – Differences tables: Challenger 650 to Challenger 650 MTO/FLEX

UPGRADE: CL-600-2B16 (650) MTO/FLEX BASE AIRCRAFT: CL-600-2B16 (650) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
DESIGN	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
Limitations	MTO AFM Supp 21	NO	NO		X			A	A
Limitations	Flex AFM Supp 22	NO	NO		X			A	A

UPGRADE:CL-600-2B16 (650) MTO/FLEX BASE AIRCRAFT: CL-600-2B16 (650) APPROVED BY (POI)_____				COMPLIANCE METHOD					
				TRAINING				CHKG/CURR	
SYSTEM ATA	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
22 - Autoflight	Auto-throttle system mode status display]	NO	NO	X				A	A
31 – Ind. & Recording	Abnormal indications for MTO	NO	NO	X				A	A
31-Ind. & Recording	ECIAS and MFD updates for MTO and FLEX	NO	NO		X			A	A
34-Navigation	FMS – MTO and FLEX Thrust Limit page	NO	YES		X			A	A
Maneuver	Nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Appendix 4 – CL-604 to CL-605 and CL-605 to CL-604

1. General

1.1 Scope

An operational evaluation was conducted to evaluate the Bombardier Inc. Original Equipment Manufacturer (OEM) training program, associated pilot qualification requirements, training, checking, currency requirements and operational suitability of the Bombardier Challenger CL-605 variant.

1.2 OE summary

During the period of August to September 2006, a TCCA Operation Evaluation Team along with the FAA Flight Standardization Board (FSB) and EASA OE panel members conducted an evaluation of the CL-600-2B16 (Challenger 605) to determine training, checking, and currency requirements for pilots who convert from the Challenger 604 (CL-604) variant to the Challenger 605 (CL-605) variant and vice versa.

1.3 Description

The changes from the CL-604 to the CL-605 include a number of weight reduction measures, an avionics upgrade and cabin upgrades. The most significant change from an operational perspective is the Rockwell Collins ProLine 21 avionics suite. The ProLine 21 uses four 10” x 12” adaptive multifunction liquid crystal displays (LCDs) rather than the six 7.25” cathode ray tubes (CRT) of the Challenger 604’s ProLine 4 suite. As well Challenger 605 includes an autothrottle system as a standard installation rather than as an option in the case of the Challenger 604. Both variants are identified as Model CL-600-2B16 (604 Variant) with the distinction dependent on the aircraft serial number.

1.4 Master difference requirements (MDRs)

Master difference requirements (MDRs) for the CL-604 and CL-605 are shown in the Appendix 2. The requirements apply to operators whose crews operate both variants, or apply for conversion between variants. The difference level definitions (A/A/A etc.) are specified in accordance with the criteria contained in JOEB OPS/FCL Common Procedures for conducting Operational Evaluation Boards (Common Procedures Document (CPD)) where the first letter refers to training requirements, the second to checking requirements and the third to currency requirements.

2. Pilot type rating

The Transport Canada type certificate data Sheet (TCDS) A-131 identifies the Challenger CL-600-2B16 as the 604 variant including the Challenger 605 and 650 as marketing designations.

In accordance with CARs Standard 421 Appendix A, the pilot type rating for the CL 600-2B16 is CL64.

3. Pilot training

3.1 Prerequisite for CL-604 to CL-605 or CL-605 to CL-604 differences training

Prior to beginning CL-604 to CL-605 or CL-605 to CL-604 differences training, flight crew must be qualified on the CL64 as per flight crew assignment in accordance with CARs 704.108 or CARs 604.143.

3.2 Challenger CL-605 initial type rating course

The Bombardier Aerospace Training Centre's CL-605 training program was closely modelled upon the original CL-604 training program and shares the same philosophy in use of resource material and courseware presentation whenever possible. Both versions of the course meet the requirements of CARs Subpart 402, 604 and 704, for the initial training of Canadian pilots to be type rated CL64 and to operate it in private and commercial service. Minimum training time requirements specified in Commercial Air Service Standard (CASS) 724.115(31) Table 1 apply.

3.3 Challenger CL-605 initial type rating course approach minimums

The CL-605 initial type training was performed to CAT I approach minimums and standard take-off minima. The additional training required to qualify operators for a Special Authorization/Specific Approval (SA) for take-off minima reported visibility RVR 1200 feet, RVR 600 Feet and CAT II was not evaluated under the scope of the OE.

3.4 Recurrent training

CL-605 recurrent training requirements shall be in accordance with the requirements of CARs 704.115 TCCA approved annual recurrent training programs and CASS 724.115 (31) minimum training time or CARs 604.139 for private operators and any additional training and currency requirements identified in this report.

3.4.1 Recurrent training CL-604 and CL-605

Recurrent training performed on either CL-604 or CL-605 variant is valid for all variants flown, provided that the differences are addressed.

When operating more than one variant, recurrent training should be alternated between the CL-604 and CL-605, as applicable.

3.5 Training Areas of Special Emphasis

The CL-605 OEB has identified the items listed below that should receive special emphasis in an approved CL-605 Training Program in addition to those listed in section 9.5 of this report.

3.5.1 Systems integration training:

1) display control panel (DCP)
2) cursor control panel (CCP)
3) integrated flight information system (IFIS)

3.5.2 Flight training

1) operations with inoperative auto throttle
2) flight control system jam procedures

3.5.3 Optional equipment

The OEB did not evaluate optional equipment.

3.6 CL-604 and CL-605 differences training

When any combination of the CL-604 and CL-605 are flown, appropriate instruction in design and systems differences will be required for both airplanes.

4. Pilot checking

4.1 Recurrent checking CL-604 and CL-605

Recurrent checking performed on either CL-604 or CL-605 variant is valid for all variants flown, provided that the differences are addressed.

When operating more than one variant, recurrent checking should be alternated between the CL-604 and CL-605, as applicable.

4.2 Line indoctrination

Immediately following the differences course, the OE team recommends line indoctrination with a training pilot to consolidate the training. The number of sectors should be a minimum of 2 sectors, 1 flown as PF and 1 flown as PM. Normal line indoctrination requirements apply following the initial pilot type rating course for CARs Subpart 704 air operators or as determined by CARs Subpart 604 for private operators.

5. Pilot currency

Currency is considered to be common for the CL-604 and CL-605. Separate tracking of currency for the CL-604 and CL-605 is not necessary or applicable. Currency will be maintained, or re-established, in accordance with section 724.115 of the CASS or the operators TCCA approved training program.

6. Flight Simulation Training Devices

As outlined in section 9.9 of this report.

7. Operational suitability

The OE determined the differences training for the CL-604 to CL-605 and CL-605 to CL-604 is operationally suitable for operations conducted under CARs Subpart 704 and CARs Subpart 604.

8. Differences tables

The Differences tables are found in Appendix 3.

Notes:

1. Validation of training, checking, and currency levels between CL-605 to CL-605(SB)/CL-650 (Annex F) and between CL-605(SB)/CL-650 to CL-605 (Annex G) was determined by operational evaluation.

2. Assessment of training, checking, and currency levels between CL-604 to CL-605(SB)/650 (Annex D) and between the CL-605(SB)/CL-650 to CL-604 (Annex E) was determined by analysis.

9. Acceptable differences tables

The Differences tables represent an acceptable means to comply with MDR provisions, for the aircraft evaluated, based on those differences and compliance methods shown. The tables do not necessarily represent the only acceptable means of compliance for operators with aircraft having other differences, where compliance methods (e.g., devices, simulators, etc) are different, or for combinations of aircraft not evaluated. For operators flying variants, which are the same as the aircraft used for the Differences tables development, and using the same compliance methods, the tables in Appendix 3 have been found acceptable by TCCA. Equivalent tables, therefore, may be approved by the POI for a particular operator.

Annex A - CARs 704 operators with an approved Level "D" training program

CASS 724.115 (10.2) (b) (ii) requires simulated line flights of at least 2 sessions (2 sectors as pilot flying and 2 sectors as pilot not flying) Pilot flying duties shall be carried out from the appropriate seat. The following scenario was found to satisfy this standard.

Simulator Period A 2.0 Hours Use of AFM supplement No. 2 Operation on wet and contaminated runways. MEL and Configuration Deviation List Review	• NDB Approach • Back Course Approach • Balked landing initiated in the low-energy regime • CFIT Escape Maneuver in IMC • 1200 RVR – Rejected Take-off • 1200 RVR – V1 Cut • 600 RVR – Rejected Take-off • 600 RVR – V1 Cut • Pilot Incapacitation • Wind shear Escape Maneuver

Simulator Period B
2.0 Hours
 	
Visual flight with dusk and night with variable VFR weather visibilities
 	
Note: CASS requires a visual training program in FFS to ensure VFR flight skills of at least 4 hrs 2 hours a PF and 2 hours as PNF
	• Take-off and landings to 100% of the published crosswind component
	• Visual takeoff (normal and crosswind) for a visual circuit with visual landing with variable wind and runway illusions
	• No electronic glideslope approach and landing
	• Approach and landing with flight control failure
	  ○ Elevator split
	  ○ Stabilizer trim malfunction
	  ○ Aileron/Elevator System jam
	• Engine inoperative approach and landing
	• Engine failure during takeoff and missed approach

Annex B - CL-604 to CL-605 and CL-605 to CL-604 line oriented flight training

For operators that choose to supplement the difference training program with line oriented flight training the following syllabus is recommended:

Simulator Period A 2.0 Hours Line flight 1st session CYYZ to CYUL Use of AFM supplement No. 2 Operation on wet and contaminated runways. Emphasis on use of company SOPs and auto throttles as applicable. Operator may elect to conduct cold weather operations line fight to introduce flight crew to use FMS temperature compensation feature	FMS programming for ➢ departure ➢ enroute ➢ holding ➢ arrival ➢ approach selection ➢ FMS performance initialization for take-off and approach ➢ FMS enroute progress monitoring • 1200 RVR or 600 RVR takeoff • SID departure to Enroute climb • Cruise introduce MFD fail • ATS revised clearance to destination • Descent to destination introduce TCAS alert (RA or TA) • Transition from descent to STAR RNAV using VNAV to fly STAR RNAV profiled altitudes • Transition to selected approach • Introduce fault at 1000 ft (engine failure) • Transition to landing at published minimums for selected approach
Simulator Period B 2.0 Hours Line Flight 2nd session CYUL- CYOW- CYYZ MEL and Configuration Deviation List Review Emphasis on use of company SOPs and auto throttles as applicable. Operator may elect to conduct hot weather operations line flight with runway limitations	• FMS programming for ➢ departure ➢ enroute ➢ holding ➢ arrival ➢ approach selection • FMS performance initialization for take-off and approach • FMS enroute progress monitoring • 1200 RVR or 600 RVR takeoff • SID departure to Enroute climb • Cruise introduce PFD fail • ATS revised clearance to destination • Introduce weather that requires deviation form routing using WX Radar • Descent to destination introduce TCAS alert (RA or TA) • Transition from descent to STAR RNAV using VNAV to fly STAR RNAV profiled altitudes • Transition to selected approach • Weather below published minimums to cause a missed approach

	• Introduce windshear • Return to field for on radar vectors with un-programmed FMS for approach and transition to crosswind landing.

Appendix 5 – Rockwell Collins Model 6605 Head Up Display (HUD) and Enhanced Vision System (EVS) CMA-2600i

1. General

1.1 Scope

An operational evaluation was conducted to evaluate the Bombardier Inc. OEM Specialty Training Program, associated pilot qualification requirements, and operational suitability of the Bombardier Challenger CL-605 equipped with a Rockwell Collins Model 6605 Head-up Display (HUD) and Enhanced Vision System (EVS) CMA-2600i Infrared Sensor System (ISS).

Note:

Only the configuration that installs the CMA-2700 Infrared Sensor System has demonstrated compliance to obtain operational credit to continue approaches to 100 feet AGL. This camera has not been assessed by TCCA and is not considered within the scope of this Appendix. Operational approval is required for credit.

1.2 OE summary

During the period of August 2009, a TCCA operation evaluation team along with the FAA Flight Standardization Board (FSB) and an EASA OE panel conducted an evaluation of the CL-605 equipped with a Rockwell Collins Model 6605 HUD/EVS CMA-2600i ISS. The OE did not complete suitability flights and this system is not certified for credit.

SECTION 1 – Rockwell Collins Model 6605 Head-Up Display (HUD)

1. Description

The Rockwell Collins 6605 HUD is an electronic and optical system that is used to generate symbology that provides the pilot with complete flight information for all phases of flight. The overhead unit projects key flight instrument data onto a small transparent display screen (combiner) which is positioned just in front of the pilot within the pilot's line of sight as they look ahead through the windscreen.

The Rockwell Collins 6605 Head-Up-Display (HUD-6605) Supplemental Type Certificate (STC) ST02177LA and TCCA equivalent STC SA10-63 is available to operators as an option.

2. Pilot training

2.1 Prerequisite for HUD training

Unless the HUD training is integrated with or occurs prior to an initial qualification PPC, a prerequisite to HUD training on a CL-605 is prior training, qualification, and currency on the CL-605.

2.2 Flight Simulation Training Devices

Initial and recurrent training requires the use of a TCCA approved level C (or higher) CL64 aircraft full flight simulator equipped with the Rockwell Collins Model 6605 HUD with day and night visuals for pilot training, checking and currency.

2.3 HUD initial ground training

For air operators and private operators, initial HUD training must include the following elements:

1) ILT covering HUD operational concepts, crew duties and responsibilities and operational procedures including prefight, normal and abnormal operations, EICAS messages, miscompare, and failure flags;

2) ILT or Computer Based Training (CBT) on the HUD symbology set and inter-relationship with airplane aerodynamics, inertial factors, environmental conditions, comparison to Primary Flight Display (PFD) and actual HUD video of the following manoeuvres:

   a. take off reference box. Use of the takeoff reference box (which is not immediately visible) and the aircraft reference symbol for take-off and go around rotation and transition to FPS and the FD cue;

   b. unusual attitudes. Transition to and from the de-cluttered display, and the use of the aircraft reference symbol during recovery and when to transition back to Flight Path Symbol (FPS);

   c. approach to stall and stall recovery. Use of the AOA limit Indicator for approach to stall awareness and its use with respect to the FPS during stall recovery; and

   d. glideslope reference line. Use of the glideslope reference line and the FPS as a sole visual approach reference.

3) The AFM Supplement, HUD pilot guide/training manual, and/or equivalent material in the Flight Crew Operations Manual (FCOM) is required, which:

   a. Explains the limitations, all modes of operation, clear descriptions of HUD symbology, (including limit conditions and failures); and

   b. Incorporates a crew procedures guide clearly delineating PF and PM duties, responsibilities and procedural call-outs and responses during all phases of flight during which HUD operations are anticipated.

2.4 HUD initial flight training

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

All required approaches should be flown from no closer than the final approach fix (FAF) for instrument approaches and from no closer than approximately 1,000 feet AGL (3 - 4 NM) to the runway threshold for visual approaches.

The following flight training program is generic in nature and should not be construed to dictate or limit what the flight course of instruction consists of. Each operator has their own unique requirements, route structure, fleet composition and operations policies to consider in developing their training program. Therefore, what follows is to be considered a guide to operators who are tailoring a HUD training program to fit their operational needs:

1) Ground Operations:
    a) deployment of HUD and stowage, including installation and removal of HUD sun-visor; and
    b) taxi using HUD under various lighting and visibility conditions.
2) Airwork:
    a) straight and level flight, accelerations and decelerations;
    b) normal and steep turns, climbs and descents;
    c) wind effects on HFDS display;
    d) approach to stall recovery; and
    e) unusual attitude recoveries.
3) Visual take-offs, circuits, approaches and landings:
    a) crosswind take-off and landing;
    b) visual approaches to runways at night with minimal lighting (“black hole” approaches)
    c) engine failure on take-off;
    d) one engine inoperative (OEI) landing; and
    e) OEI go-around
4) Instrument approaches:
    a) approaches to the lowest authorized minima;
    b) missed approach OEI;
    c) approach to landing with OEI;
    d) non-precision approach; and
    e) circling approaches (if applicable).
5) Abnormal/emergency operations (as applicable):

a) windshear escape;

b) EGPWS escape;

c) TCAS RA;

d) HUD failure on approach; and

e) approaches with the aircraft in a non-normal flap configuration.

2.5 Training matrix

Figure 1.1

Theoretical and practical training	Ground school hours (minimum)	FFS training (minimum)
Training as outlined in section 2.3	3.0	
Pilot flying		3.0
Total ** Plus written exam	3.0	3.0

*It is recommended that SIC have some familiarization with HUD from flying in the left seat.

**Written exam requirements in accordance with CASS 724.115 (1) and (5), or CARs 604.149 (2).

2.6 Training Area of Special Emphasis (TASE)

2.6.1 Ground training (TASE)

1) Crew coordination;

2) Crew briefings and callouts;

3) Duties of flying and non-flying pilots; and

4) EICAS messages and use of QRH and checklists applicable to HUD operations.

2.6.2 Flight training (TASE)

1) HUD unique symbology with the autopilot and flight director both off and on, i.e. FPS, flight path acceleration cue, airspeed error tape, low and high speed cues, flight mode annunciator, use of non-conformal symbology including the use of the FPS to recognize and recover from flight at high angles of attack and, excessive pitch

chevrons, and HUD brightness adjustments (level of screen brightness for day, night and in poor weather conditions);

2) transitioning to head down displays (HDDs) and the inclusion of HDDs in the crosscheck including EICAS displays and other cockpit indications;

3) avoidance of fixation on HUD display and symbology elements, particularly during landing flare manoeuvre and conditions that may require to turn off the HUD display;

4) HUD brightness adjustments (level of screen brightness for day, night and in poor weather conditions);

5) use of AOA limit indicator and FPS for approach to stall awareness and its use during a stall recovery;

6) use of unusual attitude display, the aircraft reference symbol, the change to a normal display, and when to transition to FPS during recoveries;

7) use of takeoff reference box and the aircraft reference symbol for the pitch rotation target on takeoff and go-around;

8) use of the glideslope reference line and FPV for visual approaches and in crosswind landings; and

9) use of HUD in conjunction with approved sun-visor.

2.7 Recurrent training

2.7.1 Recurrent ground training

Selected HUD related ground training subjects as outlined in section 2.2 of this Appendix should be reviewed on a recurrent basis.

2.7.2 Recurrent flight training

For air and private operators, recurrent training should include the following HUD operations in addition to regular requirements:

1) take-off, at the lowest authorized visibility, with crosswind;

2) take-off, at the lowest authorized visibility, engine failure before or after V1 with crosswind;

3) precision approach and landing, at the lowest authorized visibility, with crosswind;

4) approach, at the lowest authorized visibility, with crosswind, with missed approach;

5) non-precision approach(s), including circling (if applicable); and

6) selected abnormal/emergency manoeuvres (ex. TCAS RA, TAWS escape, etc.)

2.8 Seat dependent tasks

Pilots must receive training in seat dependent tasks in the seat they are assigned. Refer to section 9.7 Seat Dependent Tasks of the main body of this report.

3. Pilot checking

3.1 Pilot Proficiency Check (PPC)/ Competency Check (CC)

The following manoeuvres should be evaluated as a minimum, for initial, recurrent and upgrade:

1) Engine failure on take-off and departure;
2) Instrument approach and missed approach OEI; and
3) Failure of HUD during instrument approach.

CARs Subpart 704 or 604 flight crew members that complete initial type training that integrates the HUD or HUD training that occurs immediately following the initial type training, the PIC will complete a PPC or CC employing the HUD, within 30 days of HUD specialty training.

For CARs Subpart 704 and 604 operators, the PIC should complete a partial PPC employing the HUD, within 30 days after completion of HUD conversion training.

For CARs Subpart 704 and 604 operators, with SOP differences for the PM when the PF is heads up, the PM will complete a partial PPC or CC on HUD related PM duties, within 30 days of HUD training.

3.2. Recurrent Pilot Proficiency Check (PPC)/ Competency Check (CC)

For air and private operators, the required manoeuvres on subsequent PIC PPCs should include a sample of operations requiring the use of the HUD. For air and private operators, when there are SOP differences for the PM when the PF is heads up (compared to heads-down), the required manoeuvres on subsequent PM PPCs should include a sample of PM duties related to the use of the HUD.

4. Initial HUD line indoctrination

For air operators, PICs should complete line indoctrination employing the HUD. This requirement should include at least three HUD assisted takeoffs, one visual approach, and two instrument approaches in visual meteorological conditions (VMC).

5. HUD consolidation period

For air operators, a consolidation period should apply prior to utilizing the HUD for instrument approach operations in instrument meteorological conditions (IMC). PICs should accomplish at least ten manually flown HUD assisted take-offs 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. Upon completion of these requirements, the HUD qualified PIC should then be qualified to conduct HUD take-offs and approaches to the authorized minima as set forth in the operator's operations specifications.

6. HUD currency requirements

All air operator's PICs should have completed at least three take-offs, 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) CL-605 full flight simulator with day and night visual displays, within the previous 90 days before acting as PF using the HUD.

7. Operational suitability

The OEB found the CL-605 equipped with Rockwell Collins 6605 HUD operationally acceptable for all phases of flight.

Note:

Specialty training for Low visibility take-off 600 RVR / 1200 RVR and CAT II approach operations using the HUD were not evaluated against the Part VI and VII requirements of the CARs.

SECTION 2 – Enhanced Vision System (EVS)

1. Introduction

This Section is intended to supplement Section 1 (Rockwell Collins 6605 HUD) of this Appendix. The contents of Section 1 apply in addition to the following except where noted.

2. Pilot training

2.1 Prerequisite for EVS training

As a prerequisite for EVS training, pilots should have successfully completed HUD training on a CL-605, however, HUD and EVS training can be conducted concurrently.

2.2 EVS training- General

The Bombardier Aerospace Training Centre's CL-605 EVS course with the required prerequisites meets the requirements of CARs Subparts 604 and 704, for the initial and conversion training of Canadian pilots to operate CL-605 aircraft using the Rockwell Collins Model 6605 Head-up Display (HUD) and Enhanced Vision System (EVS) CMA-2600i Infrared Sensor System (ISS) in private or commercial service.

The EVS pilot training requirements consist of those related to initial and recurrent ground and flight training. It should be noted that the HUD and EVS training program focuses principally

upon training events flown in the left seat by the PIC (PF). Nevertheless, EVS training of PM duties in the right seat is required. SIC EVS familiarization flown in the left seat is recommended.

2.3 EVS initial ground training

For air operators and private operators, initial training should be conducted in accordance with the applicable provisions of CARs 704.108 or 604.26. For all operators, the initial ground training program should include the following elements:

1) Classroom instruction covering EVS operational concepts, crew duties and responsibilities and operational procedures including:
   a) preflight, normal, and abnormal operations; and
   b) EICAS messages, miscompare and failure flags.
2) Classroom instruction or Computer Based Training (CBT) on EVS symbology set and its inter-relationship with:
   a) airplane aerodynamics;
   b) inertial factors;
   c) environmental conditions; and
   d) comparison to HUD symbology and the Primary Flight Display (PFD).
3) The AFM Supplement, EVS pilot guide/training manual, and/or equivalent material in the Flight Crew Operations Manual (FCOM), which explains:
   a) limitations;
   b) all modes of operation;
   c) clear descriptions of EVS symbology, including limit conditions and failures; and
   d) a crew procedure guide clearly delineating PF and PM duties, responsibilities and procedural call-outs and responses during all phases of flight during which HUD operations are anticipated.

2.4 EVS initial flight training

Unless integrated with initial type rating training, flight training dedicated to EVS familiarization and proficiency is in addition to other required training elements. Initial flight training requires the use of a level C (or higher) CL-605 aircraft full flight simulator equipped with Rockwell Collins Model 6605 HUD with day and night visual displays and able to display a suitable IR image. All required approaches should be flown from no closer than the final approach fix (FAF) for instrument approaches and from no closer than approximately 1000 feet AGL (3 - 4 NM) to the runway threshold for visual approaches.

2.4.1 Generic flight training program

The following flight training program is generic in nature and should not be construed to dictate or limit what the flight course of instruction consists of. Each operator has their own unique requirements, route structure, fleet composition and operations policies to consider in developing their training program. Therefore, what follows is to be considered a guide to operators who are tailoring an EVS training program to fit their own needs. Amendments to an operator's training program require TCCA approval.

1) Ground Operations:
   a) initialization of EVS for operations; and
   b) taxi using EVS under various lighting and visibility conditions.
2) Air work:
   a) there is no additional EVS air work requirement over and above HUD training.
3) Visual take-offs, circuits and approaches:
   a) normal take-off and landing with crosswind; and
   b) visual approaches to runways at night with minimal lighting ("black hole" approaches) and use of FPS and the glideslope reference line to achieve desired descent angle.

Note:

Sufficient maneuvers should be provided of HUD/EVS 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.

4) Instrument approaches:
   a) precision and APV approaches to the lowest published minima with missed approach or landing (day and night VMC only).
5) Abnormal/Emergency Operations:
   a) failure of EVS.

2.5 Training Area of Special Emphasis (TASE)

2.5.1 Ground training (TASE)

1) crew briefings, callouts and Standard Operating Procedures (SOP's);
2) duties of PF and PM;
3) crew coordination and Crew Resource Management (CRM);
4) EICAS messages and use of QRH and Checklists applicable to EVS;

5) transition from EVS imagery to non-EVS, visual conditions. (Maximum use should be made of videos of actual HUD EVS approaches. The relative luminosity between IR imagery and that of approach lighting systems should be identified);

6) the effects of lighting conditions and crosswinds on EVS symbology and Flight Path Symbol (FPS);

7) visual anomalies such as noise, blooming, and rain;

8) appropriate use of “Clear” switch;

9) importance of the “design eye position” in acquiring the proper EVS image;

10) where PF should look to acquire the required visual references (i.e. approach lights);

11) importance of cross-checking the EVS 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;

12) use of autopilot and auto-throttle coupled approaches allowing for better pilot monitoring of the EVS image; and

13) effective and appropriate monitoring by the PM of EVS imagery presented on MFD.

2.5.2 Flight training TASE

1) proper use and setting of HUD contrast and EVS brightness controls for various ambient conditions;

2) crew briefings and callouts with emphasis on the duties of PF and PM;

3) importance of the “design eye position” in acquiring the proper EVS image;

4) manual and auto calibration functions; and

5) use of the EVS “Clear” switch.

2.6 Recurrent training

For air and private operators, the recurrent training applicable to the HUD applies with the addition of the following requirements using the EVS:

2.6.1 Recurrent ground training

Selected ground training subjects should be reviewed on a recurrent basis.

2.6.2 Recurrent flight training

An instrument approach and landing using the EVS in VMC.

3. Pilot checking

3.1 Initial EVS PPC

The checking requirements outlined in paragraph 3.1 of Section 1 of this Appendix apply as the HUD and EVS are used concurrently.

3.2 Recurrent checking requirements

The checking requirements outlined in paragraph 3.2 of Section 1 this Appendix apply as the HUD and EVS are used concurrently.

4. Initial EVS line indoctrination

For air operators, PICs should complete line indoctrination employing the EVS. This requirement should include at least three EVS assisted takeoffs at night, one visual approach at night, and two instrument approaches in VMC.

5. EVS consolidation period

For air operators using the EVS in VMC for enhanced situational awareness, no consolidation period is required.

6. EVS currency requirements

An air operator's PICs should have completed at least one night takeoff, approach and landing as PF using the Rockwell Collins 6605 HUD/EVS; or have completed at least one night takeoff, approach and landing as PF using the HUD/EVS in a TCCA approved level C (or higher) CL-605 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 HUD/EVS. The EVS currency requirement can be credited to the Rockwell Collins 6605 HUD currency requirements.

Appendix 6 – Rockwell Collins HUD/EFVS CMA-2700 ISS

Reserved.

This camera has not been assessed by TCCA.

Appendix 7 – CL-605 (SB) /CL-650 Avionics Upgrade Version 1.4.1.3

1. General

1.1 Scope

In 2015 Bombardier incorporated Rockwell Collins Proline 21 avionics upgrades into the Challenger 605 (CL-605) production configuration. An operational evaluation was conducted to evaluate the training, checking, currency and operational suitability of the CL-605 (SB) /CL-650 Avionics Upgrade Version 1.4.1.3. The production aircraft with these new avionics upgrades installed are now marketed as the Challenger 650.

1.2 OE summary

During the month of September 2015 TCCA, the FAA, and EASA conducted an Operational Evaluation Board for the CL-605 (SB) /CL-650 AVIONICS UPGRADE VERSION 1.4.1.3.

1.3 Description

The avionics upgrades to the CL-605(SB)/CL-650 include the following:

1.3.1 FMS

1) provides for automatic POS INIT using GPS Position;
2) increases worldwide database memory size;
3) capable of LPV and RNP basic Radius-to-Fix (RF) leg approaches;
4) capable of RNP AR 0.3 approaches, with or without RF legs;
5) supports FANS 1/A (CPDLC and ADS-C);
6) provides ALD calculations for contaminated runways;
7) provides for manual landing factor calculations on Approach Ref page; and
8) supports airway to airway transitions.

1.3.2 Primary Flight Display (PFD)

1) enlarged upper ADI display;
2) rescaled pitch ladder; and
3) permits selection of FPV (Flight Path Vector) on PFD.

1.3.3 Integrated Flight Information System (IFIS)

1) allows for splitting charts into briefing, minimums, and profile sections on approach;

2) provides for automatic display of airport diagram charts upon landing; and

3) increased coverage for XM Weather (optional).

1.3.4 TCAS processor (TSS-4100)

1) changes aural annunciation from “Adjust Vertical Speed” to “Level Off” during an RA.

1.3.5 Synthetic Vision System (SVS)

1) allows for selection of SVS by the pilot;

2) provides situational awareness of surrounding terrain and obstructions for the aircrew during ground and flight operations; and

3) supports situational awareness only. SVS is not to be used for navigation (Ref. Limitations section of applicable AFM).

1.3.6 MultiScan™ weather radar upgrade

1) provides for an automatic mode that controls: multiscan beam control, ground clutter suppression, smart scan, overflight protection, path attenuation compensation, temperature compensation, and geographic weather correlation; and

2) controls all weather radar functionally in automatic mode from takeoff to landing.

1.3.7 SmartRunway™ and SmartLanding™

1) provides aural and visual advisories to supplement aircrew awareness of aircraft position relative to an airport during ground and flight operations;

2) includes Runway Awareness Advisory System (RAAS), Stability Approach Monitor, Corrected Altitude Monitor, Takeoff Flap Configuration Monitor, and Long Landing Monitor; and

3) SmartRunway™ alerts are focused on runway/taxiway risks. SmartLanding™ alerts increase the probability of achieving a stabilized approach and minimizing landing risks and runway excursions.

1.4 Guidance material

1.4.1 Service Bulletin options

1) CL-605 Proline 21 Advanced SB 605-34-019, which introduces avionics upgrades is a prerequisite for new options such as:

   a) SVS: SB 605-34-019;

   b) Multiscan WxRadar: SB 605-34-020; and

   c) ADS-B out V2: SB 605-34-030.

Note:

SBs a. to c. are standard baseline on CL-650 model for aircraft serial # 6050 and subsequent.

2) The SBs listed below are additional options for both the CL-605 and CL-650 model:

   a) SR/SL: SB 605-34-022 & 650-34-010;

   b) Datalink (3rd VHF): SB 605-23-002 & 650-23-002;

   c) LINK 2000+: SB 605-23-007 & SB 650-2;

   d) SATCOM via Inmarsat: SB 605-23-009 & 650-23-009 OR Iridium: SB 605-23-011 & 650-23-005; and

   e) FANS 1/A+: SB 605-23-008 & 650-23-008.

Notes:

1. SW Version 1.4.1.3 is a Bombardier identification of the avionics upgrade. The AFM should be consulted to determine which service bulletins are applicable to the avionics upgrades installed on a particular aircraft.

2. For the purposes of this report, a Challenger 605 aircraft with some or all the avionics upgrades listed in section 1.3, is referred to as a Challenger 605(SB).

3. Training, checking and currency requirements for Required Navigation Performance Authorization Required (RNP AR) Approach avionics upgrade to the CL-605(SB) or CL-650 is dealt with in Appendix 8 of this report.

2. Pilot training

2.1 Previous experience

Flight crew members must have experience per Standard 421.40 (3) (a) (ii) and be qualified on the CL64 type as per flight crew member assignment in accordance with CARs Subpart 704 or Subpart 604.

2.2 Pilot type rating requirements

The pilot type rating designation for the CL-650 and CL-605(SB) remains CL64.

2.3 Differences training

Appendix 3 provides differences in training, checking, and currency requirements for pilots transitioning from one Challenger version (CL-604, CL-605 (with or without avionics upgrades), CL-650) to another.

2.4 Training Areas of Special Emphasis (TASE)

The following items require special emphasis in an approved training program;

1) procedures for Airway-to-Airway intercepts using the FMS 6200;
2) accepted abbreviations for textual inputs from pilot to FMS for CPDLC communications;
3) limitations on the use of SmartRunway™ and SmartLanding™ (RAAS) during normal or abnormal operations;
4) limitations on the use of SVS during flight and approaches; and
5) ½ bank application during single engine takeoffs (Heading vs. LNAV).

3. Pilot checking

Checking levels for all combinations of aircraft differences can be found in Appendix 3. A check of knowledge must be completed once training has been completed. The check could be in the form of oral questioning, written or computer base testing, or skill demonstration. Satisfactory completion must be documented in a training record.

4. Pilot currency

Applicable Currency levels can be found in Appendix 3.

5. Operational suitability

The OEB has concluded that the avionics upgrades defined by software version 1.4.1.3 and indicated in Section 1 of this Appendix are operationally suitable for operations under Subparts 704 and 604 of the CARs.

A determination of operational suitability does not constitute an operational authorization. Some of the avionics capabilities listed in Section 1 of this appendix may require regulatory approval in the form of a Special Authorization/Specific Approval (SA).

Operators should reference the latest revision of referenced advisory circulars for approval guidance:

1) AC 700-006 for RNP 4 and 10;
2) AC 700-023 Required Navigation Performance Approach (RNP APCH);
3) AC 700-025 Required Navigation Performance 1 (RNP 1);
4) AC 700-027 Radius to Fix (RF) Path Terminator; and
5) AC 700-028 Vertical Path Control on Non-Precision Approaches.

Appendix 8 – CL-605(SB)/CL-650 RNP AR Approach (0.3)

1. General

1.1 Scope

An Operational Evaluation Board conducted an evaluation of the CL-605(SB)/CL-650 Required Navigation Performance Authorization Required (0.3) specialty training associated with pilot qualification, training, checking, currency requirements and operational suitability of the CL64.

1.2 OE summary

In November 2015 TCCA as lead authority joined by EASA and the FAA conducted an OEB to evaluate the RNP AR approach (0.3) capability on the Challenger CL-605(SB)/CL-650. RNP AR (0.3) approach capability is integrated into the Rockwell Collins FMS 6200 and 1.4.1.3 software versions with SB 650-34-009. This capability may be installed on existing CL-605 aircraft via Service Bulletin (CL-605(SB)) SB 605-34-021. Both listed SBs are an option on both models and come installed on the CL-650.

1.3 Guidance material

Canadian air operators operating under CARs Subpart 704 and Canadian private operators operating under CARs Subpart 604 shall consult the following TCCA Advisory Circulars for applicable guidance and Special Authorization/Specific Approval (SA) requirements:

1) AC 700-024 Required Navigation Performance Authorization Required Approach (RNP AR APCH): Special Authorization/Specific Approval and Guidance; and

2) Challenger AFM Supplement 18 Required Navigation Performance – Authorization Required (RNP AR) Approach Operations.

This appendix only applies to CL-605(SB) and CL-650 aircraft that have the avionics upgrades installed as defined in Appendix 7 and have RNP AR avionics capability for which pilot training, checking, and currency is sought.

2. Pilot training

2.1 Previous experience

Prior to beginning RNP AR Approach (0.3) training on the CL-605(SB)/CL-650, flight crew members must have experience as per Standard 421.40 (3) (a) (ii) and be qualified on the CL64 as per flight crew member assignment in accordance with CARs Subpart 704 or Subpart 604.

2.2 Applicability

In conducting RNP AR approaches, SOP duties and procedures are assigned to both the PF and PM. Therefore, the requirement for initial and recurrent training as defined below is applicable to both PIC and SIC.

2.3 Initial ground training

Initial ground training requirements for both CARs Subpart 704 and CARs Subpart 604 operation shall be in accordance with the ground training syllabus outlined in the latest revision of TC Advisory Circular (AC) 700-024.

2.4 Flight training

Initial flight training requirements for both CARs Subpart 704 and CARs Subpart 604 operation shall be in accordance with the flight training syllabus outlined in the latest revision of AC 700-024.

Initial flight training in a qualified FSTD or CL-605(SB) or CL-650 aircraft must include:

1) four RNP AR approaches: two as PF and two as PM;
   a. two of the four approaches must have RF legs;
2) two of the four RNP AR approaches must be flown to the decision altitude (DA);
3) two of the four RNP AR approaches must be flown to an RNP missed approach;
4) one of the four RNP AR approaches must include an interrupt with vectors to resume the approach; and
5) one of the four RNP AR approaches must include a hold at an initial approach fix (IAF) or transition fix.

Notes:

1. RNP AR training in a CL-605(SB) with RNP AR capability satisfies the initial RNP AR training requirement in a CL-650 and initial RNP AR training in a CL-650 satisfies the initial RNP AR training requirement in a CL-605(SB) with RNP AR capability.
2. Flight training when conducted in the aircraft must be in VMC.

2.5 Recurrent training

Recurrent training requirements for both CARs Subpart 704 and CARs Subpart 604 operation shall be in accordance with the recurrent training outlined in the latest revision of AC 700-024.

The recurrent RNP AR flight training must include:

1) two RNP AR approaches: one as PF and one as PM;
   a) One of two approaches must have RF legs;

2) one of the two RNP AR approaches must be flown to the DA;

3) one of the two RNP AR approaches must be flown to an RNP published missed approach; and

4) 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:

Recurrent RNP AR training in a CL-605(SB) with RNP AR capability satisfies the recurrent RNP AR training requirement in a CL-650 and recurrent RNP AR training in a CL-650 satisfies the recurrent RNP AR training requirement in a CL-605(SB) with RNP AR capability.

2.6 Training Areas of Special Emphasis

Flight crew training for RNP AR operations must include the following:

1) required equipment for RNP AR approaches (MEL review and inflight considerations);

2) missed approach procedures on RF legs;

3) manually flown approaches and missed approaches;

4) temperature compensation;

5) evasive maneuver in the event of a dual FMS failure;

6) contingency procedures in case of loss of RNP capability;

7) wind effects such as wind shear or strong low level winds during final approach and during a turn;

8) effect of reducing flap angle, bank angle, decreasing or increasing speed; and

9) application of CRM and threat assessment for RNP AR operations.

Note:

The first obstacle sensitive approach conducted on actual line flight operations (ie: into mountainous region) should be performed under supervision and in favourable VMC meteorological conditions**.**

3. Pilot checking

3.1 Initial and recurrent checking requirements

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.

RNP AR checking in a qualified FSTD or CL-605(SB) or CL-650 aircraft as outlined in AC700-024.

Notes:

1. The Advanced Qualification Program (AQP) evaluator or ACP authorized to conduct RNP AR approach evaluation must have completed the RNP AR approach training and evaluation.

2. RNP AR initial or recurrent checking in a CL-605(SB) with RNP AR capability satisfies the initial or recurrent checking requirement in a CL-650, and initial or recurrent RNP AR checking in a CL-650 satisfies the initial and recurrent RNP AR checking requirement in a CL-605(SB) with RNP AR capability.

4. 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 six 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 as defined in paragraph 5 below or CL-605(SB)/CL-650 aircraft.

Any flight checking required under Subpart 704 or 604 of the CARs that requires a demonstration of RNP AR approach competency that was accomplished within the preceding six months satisfies this currency requirement.

If RNP AR approach currency is lost, currency may be re-established by completing the RNP AR approach recurrent training defined in section 2.5 and checking elements defined in section 3 of this appendix.

5. Flight Simulation Training Devices

In accordance with paragraph 9.9 of the main body of this report.

6. Operational suitability

The FSB has determined that RNP AR approach capability installed in the CL-605(SB) or CL-650 aircraft is considered operationally suitable for Part VII of the *Canadian Aviation Regulations* (CARs) and operators holding a Private Operator Registration Document issued under Subpart 604 of the CARs.

7. Differences tables

The applicable Differences tables can be found in Appendix 3, Annex H.

Appendix 9 – Steep approach operations

1. General

1.1 Scope

An operational evaluation was conducted to evaluate the Bombardier Inc. Original Equipment Manufacturer (OEM) Specialty Training program for Steep Approach Operations, associated pilot qualification requirements, and operational suitability of the CL64.

The steep approach capability of the CL64 applies to approach angles greater than 4.5 degrees and less than or equal to 5.5 degrees. This appendix specifically applies to pilot qualification and operational suitability requirements for CL64 steep approach operations at the London City Airport (EGLC) in the United Kingdom (UK).

1.2 OE summary

An operational evaluation of the CL64 steep approach capability was completed in January 2017. The OE group was a joint assembly of two regulatory agencies which was headed by TCCA and backed by the FAA.

The OE was conducted at the Bombardier Aerospace Flight Training Centre in Montreal, QC. The OE team assessed the CBT and simulator flight training on a Level D Full Flight Simulator with an approved London City Airport (EGLC) scene. Numerous steep approaches (AEO and OEI) were evaluated during day and night environments, in calm and adverse weather conditions, and under normal and non-normal aircraft conditions using a 5.5 degrees approach angle. Steep approaches were flown to either a landing, balked landing or a missed approach. The OEB team also evaluated steep approaches (AEO and OEI) on the CL-650 Flight Test Vehicle in Wichita, KS.

1.3 Guidance material

CL64 AFM Steep Approach Supplement 11 and 12.

In addition, all marketing variants of CL-600-2B16 (CL-604, CL-605, and CL-650) are eligible for steep approach operations by incorporation of applicable service bulletins noted below:

1) CL- 604 - SB-604-34-055;
2) CL- 605 - SB-605-34-008; and
3) CL- 650 - SB-650-34-008.

2. Pilot training

2.1 Previous experience

Prior to beginning Steep Approach specialty training on the CL64, flight crew members must have experience per Standard 421.40 (3) (a) (ii) and be qualified on the CL64 as per flight crew member assignment in accordance with CARs Subpart 704 and 604.

Notes:

1. Some airports with Steep Approach procedures require previous experience prior to conducting a Steep Approach at that airport. Prior to conducting Steep Approach operations into a new airport, operators should be aware that there may be additional or different training, checking, and documentation requirements than those provided in this appendix.

2. EGLC Airport Authority requires that pilots hold a Commercial or ATPL licence.

2.1.1 Steep approach training minimum time

Figure 1

Theoretical and practical training	Initial ground school hours	Recurrent ground school hours	Initial FFS training	Recurrent FFS training
Training as outlined in section 2.2	2.0	0.5		
Per Crewmember			2.0	0.5
Total (2 Crew) ** Plus, written exam for initial and recurrent	2.0	0.5	4.0	1.0

** Exam in accordance with CASS 724.115(1) (c), (5) or CARs 604.149 (2).

2.2 Initial ground training

Ground training should consist of training in the following areas and is appropriate to any flight crew member position:

1) description of all aircraft systems, displays, flight guidance, indications and alerting systems required for steep approach functionality and steep approach system states;
2) AFM steep approach Supplement 11 and 12 review, to include Limitations, Normal, Abnormal and Emergency Procedures;
    a. Performance with emphasis on landing distance requirements;
3) MMEL (MEL) relief provisions applicable to steep approach operations;
4) steep approach flight profiles with Standard Operating procedures including AEO, OEI, flap configurations, approach speeds, landing decision point (LDP), flare techniques, missed approach, balked landing procedures, and use of automated calls;
5) stabilized approach criteria specific to steep approaches at EGLC;
6) speed management during steep approach including the criteria for Vref applicable to steep approach including corrections for wind and turbulence, compliance with applicable AFM operating speed limitations, and effects of speed deviations on landing distance;
7) visual illusions specific to steep approach, including comparison of sight picture with a nominal 3.0 degrees approach, illusions of ground rush, effects of runway dimensions and crosswind on the perception of height and lateral position and illusions associated with “black hole” night approaches;
8) EGLC aerodrome to include operational limits, restrictions, taxiway layout, parking areas, ground procedures, instrument procedures, lighting systems, day/night FFS simulator scenes, airspace characteristics, hours of operation, bird threats, obstacle threats and local weather phenomena;
9) CL64 handling skills to include avoidance of abrupt control input;
10) EGLC departure and approach noise abatement procedures;
11) operational approval requirements to conduct Steep Approach operations at EGLC;
12) procedure for pilot incapacitation during steep approach operations;
13) the specific characteristics of the airport with Steep Approach landing operations such as the landing distance, hours of operation, limitations, threats, local weather phenomena etc.; and
14) method to assess knowledge acquisition of candidates.

2.3 Flight training

Flight training should include a briefing prior to the training sessions, to include system descriptions, AFM Supplement 12 content (including limitations, normal and non-normal procedures, performance information), EGLC characteristics, training areas of special emphasis and FFS training events.

Flight training should include a minimum of 4 hours of FFS training and should be divided evenly between time as the Pilot Flying (PF) and Pilot Monitoring (PM).

The flight training should include a minimum of 12 approaches to EGLC runways 09 and 27. The flight training and 12 approaches should include the following events and conditions:

1) instrument (ILS) and visual approaches and a STAR arrival;
2) a normal approach and a full stop landing;
3) a normal approach with a missed approach;
4) a normal approach with an engine failure above the Landing Decision Point (LDP) and missed approach;
5) an approach with engine failure below the LDP;
6) an approach in gusty turbulent crosswind wind conditions, with appropriate speed correction;
7) an approach flown intentionally at an excessive speed and a missed approach to comply with stabilized approach criteria;
8) a balked landing (low energy go around);
9) various meteorological conditions including weather at published minimums and dry and wet runways and crosswinds;
10) day and night operations;
11) noise abatement departure procedure and SID departure; and
12) visual approaches.

2.4 Recurrent training

Recurrent ground training should include a review of the content of the initial ground training.

2.5 Recurrent flight training

Recurrent flight training should include a minimum of three approaches to include:

1) one normal approach in IMC conditions to a full stop landing;
2) one approach with a missed approach; and
3) two approaches with a non-normal condition, with one of the approaches ending in a missed approach.

2.6 Training Areas of Special Emphasis

The following areas of special emphasis training should be provided for initial and recurrent ground and flight training:

1) speed management during steep approach under various conditions and appropriate use of speed corrections and effects on landing distance;
2) stabilized approach criteria specific to EGLC steep approach landing;
3) visual illusions including night and crosswind conditions;
4) required action during steep approach in response to an engine and/or significant system failure prior to and after the LDP;
5) go-around and balked landing considerations;
6) PF and PM task sharing (use of SOPs) especially during a balked landing (low energy go-around);
7) short runway landing considerations, techniques and landing distance requirements;
8) transition from non-visual to visual conditions and following visual approach slope indicator (VASIS) or precision approach path indicator (PAPI) in deteriorating visibility;
9) required flare technique;
10) programmed automated calls; and
11) operations on grooved runways.

3. Pilot checking

3.1 Initial/recurrent checking requirement

Operators should evaluate the knowledge of each individual flight crew member in accordance with the applicable CASS 724.115 and CARs 604.149 requirements, prior to authorizing flight crew members to conduct steep approach procedures.

Initial authorization to conduct steep approaches at a specific airport may require specific checking requirements. Requirements may include:

1) a minimum number of steep approach landings on aircraft with a qualified instructor before being permitted to conduct steep approaches as PIC; and
2) the requirement for the initial flight by the PIC to be conducted under VMC with specific minimum visibilities.

3.2 Recurrent checking requirements

The applicable CARs subpart 704 or 604 recurrent checking requirements apply.

4. Pilot currency

Each individual flight crew member should have successfully completed an operator’s approved steep approach training, prior to being authorized to conduct steep approach operations, if the flight crew member has not conducted any steep approach operations in the previous 6 months.

Note:

The OEB evaluated steep approach training for operations into London City (EGLC) UK airport. Additional currency requirements may be more restrictive at other airports with steep approach operations. It is incumbent upon the CARs Subpart 704 or 604 operator to comply with the specific currency requirements for each airport at which they conduct steep approach operations.

5. Flight Simulation Training Devices

A CL64 Full Flight Simulator qualified to level C or D with an approved visual scene for EGLC is required.

6. Operational suitability

In addition to an evaluation of the steep approach training, the OE included an evaluation of the AFM, FCOM, and QRH content applicable to the CL64 steep approach capability.

The CL64 has been determined to be operationally suitable for EGLC steep approach landing operations with an OEB assessment level D/A/D, training, checking and currency requirements.

7. Steep approach operations to other airports

Initial ground and flight training for steep approach operations other than EGLC was not assessed. Steep approach operations at other airports will require operators to adhere to the regulatory requirements of the CAA associated with that airport. Operators should be aware that there may be additional or different training and checking requirements than those provided in this appendix.

Appendix 10 – Maximum take-off thrust (MTO) and reduced take-off thrust (FLEX) functionality

1. General

1.1 Scope

An Operational Evaluation Board (OEB) was conducted to evaluate the training, checking, currency and operational suitability of the Challenger 650 (CL-650) Maximum Take-Off thrust (MTO) and Reduced Take-Off Thrust (FLEX) (MTO/FLEX) functionality.

The OEB was led by TCCA and included participation from the FAA. The OEB was conducted from May 21 to 24, 2019 at the CAE Civil Aviation Training Solutions (CATS) centre in Montreal, QC.

1.2 OE summary

The OEB team assessed ground Instructor Led Training (ILT) for MTO/FLEX which was followed by a test to evaluate training in the CL-650 FFS. The OEB also conducted suitability flights on the CL-650 (C-GBIQ) aircraft, which included multiple take-offs with all engines operating and a simulated engine failure at V1 for both MTO and FLEX thrust.

Note:

The MTO/FLEX avionics upgrade is only applicable to the CL-650 production line aircraft starting with serial number 6147. Service Bulletin SB 650-34-012 outlines the serial numbers of the CL-604 and CL-605 variants that may qualify for the MTO/FLEX functionality.

2. Pilot training

2.1 Ground training

2.1.1 Initial MTO and FLEX ground training program

The Instructor Led ground training requires training on the following:

1) auto throttle system (ATS) mode status display (MSD) indications;
2) appropriate automatic performance reserve (APR) selection;
3) use of airplane flight manual supplements (AFMS);
4) FLEX Limitations;
5) EICAS messages;
6) QRH and checklists;
7) rolling versus static take-offs; and

8) AFM limitation (AFM Supplement 22 Reduced Thrust Take-Off (FLEX):

(i) “The operator must establish a means to confirm the availability to ensure that the engine deterioration does not exceed authorized limits” in accordance with AFM Supplement 22.

2.2 Training Areas of Special Emphasis

Ground training: Crosswind procedures and technique.

2.3 Initial pilot ground training time

The minimum ground training is 2 hours.

2.4 Flight training

Not applicable.

2.5 Recurrent pilot ground and flight training

Recurrent training requirements shall be in accordance with the requirements of CARs 704.115 TCCA approved recurrent training programs or Private Operator in accordance with CARs 604.139.

3. Pilot checking

Checking differences Level: A.

4. Pilot currency

Not applicable.

5. Flight Simulation Training Devices

Not applicable.

6. Operational suitability

The OEB determined the MTO and FLEX functionality for the Challenger CL-650 is operationally suitable for operations conducted under CARs Subpart 604 and 704.

7. Differences tables

The applicable Differences tables can be found in Appendix 3, Annex I.