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Flight Standardization Board (FSB) Report

Revision: 4
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Bombardier Challenger

CL-604/CL-605/CL-650

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REVISION RECORD

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1	Highlights of Revision 1 Changes	4	12/5/2006
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HIGHLIGHTS OF REVISION 4 CHANGES

Revision 4 to this report adds Appendix 8 and Appendix 9.

Appendix 8 denotes the training, checking, and currency requirements for avionics upgrades to Challenger 605 aircraft (CL-605^(SB) with Service Bulletin(s)) or new aircraft marketed as the Challenger 650 (CL-650). Training, checking, and currency requirements relative to the RNP AR 0.3 capability of the CL-605^(SB) and CL-605 are excluded (See Appendix 9).

Appendix 9 denotes the training, checking, and currency requirements for the RNP AR 0.3 avionics upgrade to CL-605 aircraft (CL-605^(SB) with RNP AR 0.3 Service Bulletin) or new aircraft marketed as the Challenger 650 (CL-650).

1 PURPOSE AND APPLICABILITY

- 1.1 The Bombardier Challenger 604 (previously known as the Canadair CL-604) is identified as model CL-600-2B16 on the FAA type Certificate Data Sheet A21EA. Beginning with aircraft serial number 5701, model CL-600-2B16 aircraft will be referred to by the manufacturer as Bombardier Challenger 605. For brevity in this report, references to the Bombardier Challenger 605 will be shortened to CL-605.
- 1.2 The primary purpose of this report is to specify FAA master training, checking, and currency requirements applicable to crews operating CL-604 and CL-605 model airplanes. The CL-605 is a variation of the CL-604. Major changes from the CL-604 to the CL-605 are the addition of a Rockwell Collins Proline 21 avionics suite, which consists of 4 multi-function flat panel LCD units, reduced aircraft weight, larger cabin windows, autothrottle as standard equipment, and a new tail cone design.
- 1.3 This report will aid 14 CFR part 135 Operators, FAA Principal Operations Inspectors (POIs), and 14 CFR part 142 training centers and their FAA Training Center Program Managers (TCPMs) in the development and approval of 14 CFR part 135 and 142 training programs. Provisions of this report are effective until amended, superseded, or withdrawn by subsequent FSB determinations.
- 1.4 This report also addresses certain issues regarding the operation of CL-604 and CL-605 aircraft other than under 14 CFR part 135. Provisions of the report include:
 - 1.4.1 Defining pilot "type rating",
 - 1.4.2 Description of "Master Common Requirements" (MCRs),
 - 1.4.3 Description of "Master Differences Requirements" (MDR's) for crews requiring differences qualification for mixed-fleet-flying or transition,
 - 1.4.4 Examples of acceptable "Operator Difference Requirement (ODR)" Tables,
 - 1.4.5 Description of an acceptable training program, special emphasis items, and training device characteristics when necessary to establish compliance with pertinent Master Differences Requirements (MDRs),
 - 1.4.6 Setting checking and currency standards, including specification of those checks that must be administered by FAA or operators, and
 - 1.4.7 A listing of regulatory compliance status (compliance checklist) for 14 CFR parts 91 and 135, Advisory Circulars, and other operationally related criteria that was reviewed and evaluated by the Aircraft Evaluation Group (AEG) or Flight Standardization Board (FSB).

1.5 This report also provides:

1.5.1 Minimum pilot training, checking and currency requirement that must be applied by: FAA field offices (i.e. MCRs, MDRs, ODRs, etc.), Aviation Safety Inspectors, 14 CFR part 135 Air Carrier Check Pilots and Instructors, Airline Transport Pilots instructing in air transportation service, Certificated Flight Instructors, Certificated Ground Instructors, Designated Pilot Examiners, Pilot Proficiency Examiners, and Training Center Evaluators.

1.5.2 Information which is advisory in nature, but may be mandatory for particular operators if the designated configurations apply and if approved for that operator (i.e. MDR footnotes and acceptable ODR Tables).

1.5.3 Information which is used to facilitate FAA review of an airplane type proposed for use by an operator.

1.6 Various sections of this report are qualified as to whether compliance (considering the provisions of FAA Advisory Circular 120-53) is required or is advisory in nature.

1.7 Relevant acronyms are defined as follows:

AC	Advisory Circular
ACO	Aircraft Certification Office
ADG	Air Driven Generator
ADI	Attitude Deviation Indicator
ADS-C	Automatic Dependent Surveillance -Contract
AFCS	Automatic Flight Control System
AFM	Airplane Flight Manual
ALD	Actual Landing Distance
AP	Autopilot
APR	Automatic Performance Reserve
ARP	Air Data Reference Panel
CCP	Cursor Control Panel
CDU	Control Display Unit
CHDO	Certificate Holding District Office
CPDLC	Controller-Pilot Data-Link Communications
DCP	Display Control Panel
DRP	Display Reversionary Panel
EFB	Electronic Flight Bag
EFIS	Electronic Flight Instrument System
EGPWS	Enhanced Ground Proximity Warning System

EICAS	Engine Indicating and Crew Alerting System
FANS	Future Air Navigation System
FCP	Flight Control Panel
FMA	Flight Mode Annunciator
FMS	Flight Management System
FPV	Flight Path Vector
FSB	Flight Standardization Board
FSTD	Flight Simulation Training Device
FTD	Flight Training Device
HUD	Head Up Display
IFIS	Integrated Flight Information System
IRS	Inertial Reference System
LPV	Localizer Performance with Vertical Guidance
MDR	Master Differences Requirements
MFD	Multi-Function Display
ODR	Operator Differences Requirements
PFD	Primary Flight Display
PM	Pilot Monitoring
POI	Principal Operations Inspector
QRH	Quick Reference Handbook
RA	Resolution Advisory
RAAS	Runway Awareness Advisory System
RF	Radius-to-Fix
RNP AR	Required Navigation Performance Authorization Required
RTU	Radio Tuning Unit
SA	Situational Awareness
SBAS	Satellite Based Augmentation System
SVS	Synthetic Vision System
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Alert and Collision Avoidance System
TCE	Training Center Evaluator
TCPM	Training Center Program Manager
VNAV	Vertical Navigation
WOW	Weight on Wheels
WX	Weather

1.8 Terminology

The term "must" is used in this report, even though it is recognized that this report, and the Advisory Circular AC 120-53 on which it is based, provides one acceptable means, but not necessarily the only means, of compliance with 14 CFR part 135 Subpart H requirements. The term "must" acknowledges the need for operators to fully comply with the FSB report provisions if AC-120-53 is to be used by the operator as its means of complying with 14 CFR part 135, Subpart H.

1.9 Background

1.9.1 In August and September 1995, the CL-604 Flight Standardization Board (FSB) completed a CL-604 initial pilot ground school utilizing Canadair's training facilities in Montreal, Canada. Training was received in a classroom and in a Canadair Regional Jet simulator. No CL-604 simulator had been manufactured at that time. The FSB then received flight training in the CL-604 aircraft in Wichita, Kansas. It then conducted AC 120-53 test T5, which was essentially an evaluation of all 14 CFR part 61 Appendix A maneuvers.

1.9.2 In August and September 2006 the CL-605 Flight Standardization Board (FSB) conducted an evaluation of the CL-605 in accordance with the process outlined in AC 120-53. The purpose was to determine if Bombardier's proposal to allow the CL-604 and CL-605 to have the same pilot type rating was valid. One group of 2 previously qualified CL-604 pilots received CL-604 refresher training. Another group of 2 pilots received CL-605 initial pilot ground school utilizing the training facilities of Bombardier Aerospace Training Center.

The CL-604 pilots then received differences training in the CL-605 and underwent pilot proficiency checks and Line Oriented Flights (LOF) in a CL-605 simulator. The CL-605 pilots received differences training in the CL-604 and underwent pilot proficiency checks and Line Oriented Flights (LOF) in a CL-604 simulator.

Each group underwent pilot proficiency checks in the CL-605 airplane and participated in two days of CL-605 flights to determine 14 CFR parts 91 and 135 operational suitability, and to validate proposed AFM normal, abnormal, and emergency procedures.

1.9.3 The FSB is responsible for conducting future evaluations of the CL-604 and CL-605 aircraft, its derivatives, and all changes to the aircraft, such as software modifications and/or the addition of HUD or similar new systems. The FSB then determines the associated impact on training, checking, and currency and amends this report accordingly.

2 PILOT "TYPE RATING" REQUIREMENTS

2.1 In accordance with the provisions of 14 CFR parts 1, 61, and 135, the same pilot type rating is assigned to the CL-604 and the CL-605, and is designated "CL-604".

2.2 The pilot type rating for the CL-604 and CL-605 has been established as "CL-604". The Canadair/Bombardier CL-604 and Bombardier CL-605 shares the same Type

Certificate Data Sheet (A21EA) and Model number (CL-600-2B16) as previous Canadair Challenger Series aircraft (CL-600, CL-601-1A, CL-601-3A, and CL-601-3R). Those preceding aircraft all share the same pilot type rating "CL-600". The CL-604 and CL-605 aircraft are not considered variations or derivatives of the Canadair Challenger Series aircraft (CL-600, CL-601-1A, CL-601-3A, and CL-601-3R) for pilot type rating purposes. The FSB did not conduct a comparison between CL-600/601-1A/601-3A/601-3R aircraft and the CL-604 or CL-605; therefore, no credit may be given between these aircraft for training, checking, or currency.

- 2.3 The CL-604 and CL-605 are not considered a variation or a derivative of the Canadair Regional Jet (CL-600-2B19) for pilot type rating purposes. The Canadair Regional Jet pilot type rating is "CL-65". The FSB did not compare the CL-65 to the CL-604 or CL-605; therefore no credit may be given between these aircraft for training, checking, or currency.

3 "MASTER COMMON REQUIREMENTS" (MCRs)

- 3.1 Master Common Requirements for all CL-604 and CL-605 airplanes:

3.1.1 Normal 'Final' Landing Flap Setting:

The normal 'final' landing flap is 45 degrees for the CL-604 and CL-605.

3.1.2 Automatic Flight Control System (AFCS):

The AFCS pilot/machine interface is the same for the CL-604 and CL-605.

3.1.3 Aircraft Operating Weights:

Aircraft maximum operating weights are the same for both the CL-604 and CL-605 aircraft.

3.1.4 Handling and Performance:

Handling and performance are identical for both aircraft.

3.1.5 V Speeds:

All maximum speeds for landing gear and flaps are identical for both aircraft. V Speeds for takeoffs and approaches are dependent upon aircraft weight and are identical for both aircraft when operated at the same weight.

3.1.6 Engine Indicating and Crew Alerting System (EICAS) and Synoptics

Only minor changes to crew alerting messages and applicable synoptic page architecture have been made to support the CL-605 Pro Line 21 changes in displayed information.

3.1.7 Primary and Secondary Flight Controls:

Pilot operation of the primary and secondary flight controls is the same for both the CL-604 and CL-605.

3.1.8 Procedure Knowledge:

Takeoff Climb and Descent Profiles:

The takeoff, climb, and Descent Profiles for the CL-604 and CL-605 are identical for both aircraft.

3.1.9 Landing Minima Category (FAR 97.3)

The following straight-in approach minima (based on Maximum Landing Weight (MLW) and 1.3 times V_{so}) for the CL-604 and CL-605 are as follows:

Aircraft	Landing Flap	Category
CL-604	45 degrees	C
CL-605	45 degrees	C

3.1.10 Approach Profiles and Speed:

The approach profiles are the same for the CL-604 and CL-605.

Approach speeds are dependent upon aircraft weight. All critical speeds are automatically presented to the pilot in a standardized manner for the CL-604 and CL-605 aircraft.

3.1.11 Abnormal & Emergency Procedures:

Abnormal and emergency procedures are presented in Quick Reference Handbooks (QRH). The QRH's for both aircraft share an identical presentation format and direct the pilots to carry out emergency or abnormal procedures in a methodical and structured manner.

4 “MASTER DIFFERENCE REQUIREMENTS” (MDRs)

- 4.1 Master Difference Requirements (MDRs) for the CL-604 and CL-605 are shown in Appendix 1. Appendix 1 provisions apply when differences between variations exist which affect crew knowledge, skills, or abilities related to flight safety (e.g. Level A or greater differences)

5 ACCEPTABLE "OPERATOR DIFFERENCE REQUIREMENTS" (ODRs) TABLES

- 5.1 Operator Difference Requirement (ODR) tables are used to show an operator's compliance method. ODR tables for operators conducting mixed fleet operations, using the CL-604 and CL-605 are shown in Appendix 2. The ODR tables represent an acceptable means to comply with MDR provisions based on those differences and compliance methods shown. The tables do not necessarily represent the only acceptable means of compliance for operators with airplanes having other differences, where compliance methods (e.g., devices, simulators, etc.) are different. For operators flying the CL-604 and CL-605 the ODR tables in Appendix 2 have been found acceptable, and therefore, may be approved by a POI for a particular operator.

5.2 Operator Preparation of ODR Tables:

Operators seeking different means of compliance must prepare and seek FAA approval from their POI of specific ODR tables pertinent to their fleet. The POI should coordinate this with the FSB Chairman and AFS-200.

5.3 ODR Table Coordination:

New ODR tables proposed by operators should be coordinated with the FSB prior to FAA approval and implementation. Through this coordination, the FSB can ensure consistent treatment of variations between various operators' ODR tables and compatibility of the MDR table with MDR provisions.

5.4 ODR Table Distribution:

Originally approved ODR tables are retained by the operator. Copies of approved CL-604 and CL-605 tables are retained by the Certificate Management Office (CMO). Copies of all approved ODR tables should be forwarded to the FSB Chairman, Long Beach Aircraft Evaluation Group (AEG).

6 FSB SPECIFICATIONS FOR TRAINING

6.1 General:

- 6.1.1 The provisions of this training section apply to CL-604 and CL-605 programs for airmen having previous experience in 14 CFR part 91 or 14 CFR part 135 air carrier operations, and in multi-engine turbojet or turboprop aircraft. Additional requirements, as determined by the operator's POI, the FSB, and AFS-200, may be necessary for airmen not having such experience. Appendix 3 contains a list of special emphasis items to be included in an approved training program.

6.2 Initial, Transition and Upgrade Training:

- 6.2.1 Pilot Initial, Transition, and Upgrade Ground Training is accomplished in accordance with 14 CFR § 135.343 and §135.345.
- 6.2.2 Pilot Initial, Transition, and Upgrade Flight Training is accomplished in accordance with 14 CFR § 135.347.

6.3 Recurrent Training:

- 6.3.1 Recurrent Ground Training is accomplished in accordance with 14 CFR § 135.351.
- 6.3.2 Recurrent Flight Training is accomplished in accordance with 14 CFR § 135.351 and requires that the pilot be proficient in those maneuvers and procedures that are required for the original issuance of the pilot certificate.

6.4 Differences Training:

Differences training is accomplished in accordance with 14 CFR § 135.347. 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, consistent with MDR provisions listed in Appendix 1. In addition, any changes in aircraft software (ex. upgrades from version X to version Y) involving the entire fleet would require differences training.

6.5 Other Training:

- 6.5.1 Flight Attendant Training is accomplished in accordance with 14 CFR § 135.341 and §135.349 if a flight attendant is utilized. The CL-604 and CL-605 have a maximum seating capacity of 19 seats and therefore, do not require a Flight Attendant. [Reference 14 CFR § 135.107]

6.5.2 Aircraft Dispatcher Training, Initial Operating Experience, Flight Engineer Training, and Flight Navigator Training are not applicable.

7 FSB SPECIFICATIONS FOR CHECKING

7.1 General

7.1.1 The provisions of this checking section apply to the CL-604 and CL-605. Testing, Checking, and Evaluations specified by 14 CFR §§ 61.57, 61.58, 61.63, 61.67, 61.157, 61.159, 135.293, 135.297, and FAA Practical Test Standards (PTS) apply.

7.1.2 The following areas of emphasis must be demonstrated during checking:

- a. Proficiency in manual and automatic (including FMS and autothrottle) flight in normal, abnormal, and emergency situations must be demonstrated at each proficiency/competency check by all crewmembers.
- b. The use of manual modes to operate systems such as electrical, hydraulic, pressurization, flight controls, etc. and emergency equipment, such as the ADG, must be demonstrated at each proficiency/competency check by all crewmembers.
- c. Demonstration of a no flap approach and landing during a pilot type rating or 14 CFR part 135 check is required per the Airline Transport Pilot and/ or Type Rating Practical Test Standards - FAA-S-8081-5, Area of Operation VI, Task I. In accordance with Order 8900.1, Volume 5, Chapter 3, Section 2, when the flight demonstration is conducted in an airplane, verses a simulator, touchdown from a no flap approach is not required. The approach must be flown to the point where the inspector or examiner can determine whether a touchdown would occur in the touchdown zone on the runway and a safe landing to a full-stop could be made.

7.2 Type Ratings:

Type rating Practical Tests are administered in accordance with 14 CFR §§ 61.63, 61.157, 61.159, and the Practical Test Standards.

7.3 Competency/Proficiency Checks and Evaluations:

Competency/Proficiency checks and evaluations are administered in accordance with 14 CFR §§ 61.58, 135.293, and §135.297.

8 FSB SPECIFICATIONS FOR CURRENCY

- 8.1 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 14 CFR §§ 61.57, 61.58, 135.247 and/or §135.351.

9 AIRCRAFT REGULATORY COMPLIANCE CHECKLIST

9.1 Operating Rules Compliance Checklist:

The Operating Rules Compliance Checklists (Appendix 4 and Appendix 5) are provided as an aid to FAA Certificate Holding District Offices (CHDOs) to identify those specific rules or policies for which compliance has already been demonstrated to the FAA for a particular aircraft. The checklist also notes rules or policies, which must be demonstrated to CHDOs by the operator. Not all rules or policies are necessarily listed or addressed. It continues to be the responsibility of the CHDO to review compliance with pertinent rules or policies not already satisfactorily addressed in the Operating Rules Compliance Checklist, prior to 14 CFR part 135 approval for an operator to use the CL-604 or CL-605 in service.

The Operating Rules Compliance Checklist in Appendix 4 reflects the status of the first production CL-604 aircraft flown by the FSB on September 6-14, 1995. The aircraft serial number was 5301 and bore Canadian. Registration C-FVUC.

The Operating Rules Compliance Checklist in Appendix 5 reflects the status of a CL-605 flight test aircraft flown by the FSB on September 5-7, 2006. The aircraft serial number was 5701 and bore Canadian Registration C-FGYM.

9.2 Forward Observer's Seat:

14 CFR § 135.75(b) requires that a forward observer's seat on the flight deck be provided for use by the Administrator while conducting enroute inspections. The FSB has not made any operational acceptability findings on any forward observer's seat in the CL-604 or CL-605 because it does not have a forward observer's seat as part of its Type Design. (The CL-604 and CL-605 aircraft evaluated by the FSB had a forward observer seat installed, but it was not representative of a possible production version. It was intended for flight test purposes only.)

10 FSB SPECIFICATIONS FLIGHT SIMULATION TRAINING DEVICES (FSTD)

10.1 FSTD Characteristics:

- 10.1.1 FSTD characteristics are designated in 14 CFR Part 60.
- 10.1.2 The acceptability of differences between devices, simulators, and aircraft must be addressed by the POI.

10.2 FSTD Approval:

- 10.2.1 Qualification of the device is determined by the issuance of a Statement of Qualification from the National Simulator Program.
- 10.2.2 Requests for device approval in a training program should be made to the respective FAA representative.

11 APPLICATION OF FSB REPORT

- 11.1 All relevant parts of this report are applicable to operators on the effective date of this report.

12 ALTERNATE MEANS OF COMPLIANCE TO THIS REPORT

12.1 Approval Level and Criteria

- 12.1.1 The FSB chairman should be consulted by the POI, TCPM, Program Manager, or other FAA representative, when alternate means of compliance, other than those specified in this report, are proposed. Alternate means of compliance must be approved by the FAA Air Transportation Division, AFS-200 and Commercial and General Aviation Division, AFS-800 Washington Headquarters. If an alternate means of compliance is sought, operators will be required to submit a proposed alternate means for approval that provides an equivalent level of safety to the provisions of AC 120-53 and this FSB report. Analysis, demonstrations, proof of concept testing, differences documentation, and/or other evidence may be required.
- 12.1.2 In the event that alternate compliance is sought, training program hour reductions, simulator approvals, and device approvals may be significantly limited and reporting requirements may be increased to ensure an equivalent level of training, checking, and currency.

FAA 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.

13 MISCELLANEOUS

13.1 Landing Minimum Category

In accordance with 14 CFR § 97.3, the CL-604 and CL-605 is operated as a Category C aircraft during straight-in approaches. 1.3 V_{so} at a flap setting of 45 degrees is 137 knots at the maximum gross landing weight of 38,000 pounds.

14 SUPPLEMENTAL BOARD REPORT - PART II

14.1 Part II of the FSB report contains historical development information used to develop Part I. This information is kept on file at the Long Beach Aircraft Evaluation Group, (LGB AEG), 3960 Paramount Boulevard, Suite 100, Lakewood, CA 90712-4137.

Documents kept on file are as follows:

CL-604 /CL-605/CL-650:	
Master Minimum Equipment Lists	Aircraft Flight Manual
Operations Manuals	FSB Member Assignment Memo
Training Syllabus for FSB Members	Operational Issue Papers

Appendix 1 - MDR TABLE

PILOT TYPE RATING: CL-604		FROM AIRPLANE	
TO AIRPLANE		604	605
	604	-----	C*/B/A
	605	C*/B/A	-----

* Level C differences training is the highest training level required for the Challenger 604 and 605. In the case of pilots moving from one variation to the other, operators and training providers must provide pilots with training permitting them to become fully cognizant of the differences in flight deck layout and avionics controls.

Interactive computer based training is suitable to impart the necessary knowledge. However, the operator is responsible to ensure the training is consolidated through the use of a device which provides for tactile manipulation of system related controls and switches, and emulates panel and instrument indications. An acceptable "device" as described in this paragraph is one that replicates the functionality, operation and installation of the Collins Proline Avionics system in the Challenger 604 or 605, as appropriate, and may include, but is not limited to, an FTD, aircraft simulator, or aircraft.

Appendix 2 - ACCEPTABLE ODR TABLES

Definitions ODR Training Levels

Definitions	ODR Training Level
"HO" = Handout	A
"S/T" = Slide/Tape presentations "TCBT" = Tutorial Computer Based Training "SU" = Stand-up lectures "VT" = Video Tapes	B
"ICBT" = Interactive Computer Based Training "CSS" = Cockpit System Simulators "CPT" = Cockpit Procedures Trainers "PTT" = Part Task Trainers "FTD 4-5" = Flight Training Devices (level 4-5)	C
"FTD 6-7" = Flight training devices (level 6-7) "FFS A-D" = Full Flight Simulators (level D or lower)	D
"FFS C-D" = Full Flight Simulators (level C or D) "ACFT" = Aircraft	E

Appendix 2: Annex A – ODR 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	2 nd 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

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
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
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 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
31 Indicating and Recording	APU temperature and RPM display on MFD is different in format.	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	EFIS - Advisory AOA indicator available on each PFD	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
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 and location is 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	Minor	X				A	A
34 Navigation	FMS Color convention on PFD differs	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
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
	Not Applicable								

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

Appendix 2: Annex B – ODR 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
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
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

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	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 on PFD differs.	No	No	X				A	A
34 Navigation	FMS CDU. Larger CDU- 6000 installed. Alpha-numeric key layout differs.	No	Minor	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

Appendix 4 – CHALLENGER 604 OPERATING RULES COMPLIANCE CHECKLIST

The first production CL-604 aircraft, serial number 5301, was utilized by the FSB to conduct its evaluation on September 5 - 14, 1995. This aircraft was, except for a few items, representative of an aircraft that could be issued a U.S. Airworthiness Certificate. It enabled the FSB to determine compliance with the appropriate 14 CFR parts 91 and 135 operating requirements.

Any U.S. operator wishing to operate the CL-604 aircraft will have to demonstrate to the FAA that the aircraft fully complies with all applicable 14 CFR Parts prior to that aircraft entering service. The checklist may be used by the operator to show compliance with those items listed in it.

The Compliance Checklist for the CL-604 is retained at the Long Beach Aircraft Evaluation Group office at 3960 Paramount Blvd. Suite 100, Lakewood, CA. 92712. Copies may be obtained by contacting the Long Beach AEG Office at (562) 657-5317.

Appendix 5 – CHALLENGER 605 OPERATING RULES COMPLIANCE CHECKLIST

Serial number 5701 was utilized by the FSB to conduct its evaluation on September 11, 2006. Serial number 5701 was a flight test aircraft that had been modified to become production equivalent. It enabled the FSB to determine compliance with the appropriate 14 CFR parts 91 and 135 operating requirements.

Any U.S. operator wishing to operate the Challenger 605 aircraft will have to demonstrate to the FAA that the aircraft fully complies with all applicable 14 CFR parts prior to that aircraft entering service. The checklist may be used by the operator to show compliance with those items listed in it.

The Compliance Checklist for the CL-605 is retained at the Long Beach Aircraft Evaluation Group office at 3960 Paramount Blvd. Suite 100, Lakewood, CA. 92712. Copies may be obtained by contacting the Long Beach AEG Office at (562) 657-5317.

The Compliance Checklists for the CL-605 and CL-650 are identical. The CL-605 Compliance Checklist may be used for the CL-650 to show compliance with 14CFR parts 91 and 135 operating requirements.

Appendix 3 - TRAINING PROGRAM SPECIAL EMPHASIS ITEMS

SECTION A. The FSB has identified several aircraft systems and/or procedures (listed below) that should receive special emphasis in an approved CL-604 Training Program, or CL-605 Training Program where applicable:

Systems Integration Training:

- a) Flight Control Panel (FCP)
- b) Flight Mode Annunciator (FMA)
- c) Flight Management System (FMS)

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

- a) Dual hydraulic system malfunctions (system 1 or 2, and system 3)
- b) Air Driven Generator (ADG) deployment
- c) ILS approach on standby instruments
- d) Primary Flight Display (PFD), Multifunction Display (MFD), EICAS status page reversionary modes
- e) Inability to exclusively use EICAS messages to determine aircraft system status. Some switches (i.e. L/R to aux fuel transfer, fuel crossflow, and AC essential bus transfer) are not represented by EICAS messages.

The FSB also found that early exposure to the FCP, FMA and FMS is important, especially for pilots with no previous EFIS or FMS experience. Establishing early confidence in manually flying the aircraft, converting from manual to automatic (FMS controlled) flight mode and back is equally important due to heavy reliance on the Automatic Flight Control System (AFCS). In the event of a flight path deviation due to input error or system malfunction, the flight crew must be able to comfortably transition from automatic to manual mode and back in an orderly fashion.

The FSB found the following Special Flight Characteristics:

Special emphasis during training should be placed in the area of roll control during multiple hydraulic system failure, crosswind landing and rollout, and zero-flap landing.

The FSB has determined that zero-flap approaches and landings to a full stop are required to be demonstrated by applicants seeking type certification in this aircraft. The aircraft's trailing edge flap extension is powered by the electrical system and there is no alternate means of flap operation in the case of electrical system failure. The aircraft has a relatively high approach and landing speed and has a tendency to "float" if normal landing flare technique is used. Thrust reverser deployment during a zero flap landing tends to cause the nose to pitch-up, requiring significant pilot input to maintain nose wheel contact with the runway.

SECTION B. In addition to the items delineated in Section A, the CL-605 FSB has identified additional items (listed below) that should receive special emphasis in an approved CL-605 Training Program:

Systems Integration Training:

- a) Display Control Panel (DCP)
- b) Cursor Control Panel (CCP)
- c) Integrated Flight Information System [IFIS] [Optional equipment not evaluated by FSB]

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

- a) Operations with inoperative Autothrottle
- b) Flight Control System Jam procedures

The FSB found the following Special Flight Characteristics:

The CL-605 FSB found no additional special flight characteristics other than that described in Section A. The Special Flight Characteristics defined in Section A, also pertain to training in the CL-605 where applicable.

APPENDIX 6 –ROCKWELL COLLINS MODEL 6605 HEAD-UP DISPLAY (HUD) SYSTEM

1 BACKGROUND

- 1.1 The Bombardier Challenger CL-605 Flight Standardization Board (FSB) participated in an evaluation of the Rockwell Collins Model 6605 Head-up Display System (HUD) in August 2009 using a Bombardier Challenger CL-605 Level D simulator and CL-605 aircraft. At Bombardier's Flight Test facility in Wichita, KS, the FSB completed numerous HUD approaches at several different airports, using CAT I procedures during day and night,
- 1.2 The FSB found the Rockwell Collins Model 6605 HUD operationally suitable for all phases of flight and for U.S. CAT I operations. Low visibility takeoff and CAT II operations using the HUD were not evaluated against 14 CFR part 91 or 135 requirements.

2 PREREQUISITES FOR HUD TRAINING

Unless the HUD training is integrated with, or occurs sequentially preceding an initial qualification pilot proficiency check, a prerequisite to HUD training in a Bombardier Challenger CL-605 airplane, is prior training, qualification and currency in the Bombardier Challenger CL-605.

3 HUD TRAINING - GENERAL

- 3.1 The HUD pilot training requirements consist of those related to initial and recurrent ground and flight training. It should be noted that the HUD training program focuses principally upon training events flown in the left seat by the Pilot-In-Command (PIC) as Pilot Flying (PF). Nevertheless, HUD training of Pilot Monitoring (PM) Second-In-Command (SIC) duties in the right seat is required, where there are procedural differences for the PM, and when the PF is heads up (compared to heads down). SIC HUD familiarization flown in the left seat is recommended.
- 3.2 Flight crewmember training must be accomplished using a CL-605 Level C simulator with a daylight visual display, or a CL-605 Level D simulator, or a CL-605 aircraft equipped with a Rockwell Collins Model 6605 Head-up Display System. The FSB has determined that each pilot in command should receive a minimum of 3 hours of HUD ground school training, followed by a minimum of 3 hours of HUD flight training, in the left seat, in either an approved CL-605 Level C or D simulator or CL-605 aircraft. (The 3 hours of ground and 3 hours of flight training is an initial requirement only.)

- 3.3 A person who progresses satisfactorily through flight training, is recommended by an instructor, and successfully completes the appropriate HUD proficiency check by a person authorized by the Administrator, need not complete the recommended 3 hours of flight training.

4 HUD INITIAL GROUND TRAINING

4.1 The initial HUD ground training program should include the following elements:

- a. Classroom instruction covering HUD operational concepts, crew duties and responsibilities and operational procedures including preflight, normal and abnormal operations, Glideslope angle modification in the FMS, EICAS messages, use of AFMS, QRH, and checklists, miscompare, and failure flags.
- b. Classroom instruction or Computer Based Training (CBT) on the HUD symbology set and its inter-relationship with airplane aerodynamics, inertial factors, environmental conditions and comparison to the Primary Flight Display (PFD).

NOTE: Actual HUD video should be used to reinforce training in the following areas:

- (1) Take off and Go Around. Use of the Takeoff Reference Line Indicator (which is not immediately visible) and the Aircraft Reference symbol for takeoff and go around rotation and the transition to the Flight Path Symbol (FPS) and the Flight Director Guidance Cue (FD).
 - (2) Unusual Attitudes. Transitions to and from the decluttered display, and the use of the Aircraft Reference symbol during the recovery and when to transition back to the FPS.
 - (3) Approach to Stall and Stall Recovery. Use of the Angle-of-Attack Limit Indicator for approach to stall awareness and its use with respect to the FPS during stall recoveries.
 - (4) Glideslope Reference Line. Use of the Glideslope Reference Line and the FPS as the sole final visual approach reference.
- c. A Rockwell Collins Model 6605 Head-Up Guidance (HGS) pilot guide, Model 6605 HUD/EVS Aircraft Flight Manual Supplement (AFMS), or equivalent materials (ex. Flight Crew Operations Manual (FCOM), which explain HUD limitations, modes of operation, descriptions of HUD symbology, limit conditions and failures, and which define crew procedures that delineate PF and PM duties, responsibilities, and call-outs during all phases of flight in which HUD operations are conducted.

d. Special Emphasis ground training shall be conducted in the following areas:

- (1) Crew Coordination
- (2) Crew Briefings and Callouts
- (3) Duties of flying and non-flying pilots; and
- (4) EICAS messages and use of the Quick Reference Handbook (QRH) and checklists applicable to HUD operations.

5 HUD INITIAL FLIGHT/SIMULATOR TRAINING

5.1 Unless integrated with CL-605 initial type rating training, flight training dedicated to HUD familiarization and proficiency is in addition to other required training elements.

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

5.3 The following HUD flight training program is generic in nature and should be considered as a minimum training requirement only.

a. Ground Operations:

- (1) Deployment of HUD and stowage, including installation and removal of the HUD sun-visor; and
- (2) Taxi using HUD under various lighting and visibility conditions.

b. Airwork:

- (1) Straight and level flight, accelerations and decelerations,
- (2) Normal and steep turns, climbs and descents,
- (3) Wind Effects on HUD display,
- (4) Approach to stall recovery, and
- (5) Recovery from unusual attitudes.

c. Visual Take-offs, Approaches and Landings:

- (1) Crosswind take-off and landing,
- (2) Visual approaches to runways at night with minimal lighting ("black hole" approaches) and use of FPS and Glideslope Reference Line to achieve desired descent angle,
- (3) Engine failure on take-off,
- (4) One Engine Inoperative (OEI) landing, and
- (5) OEI go-around.

d. Instrument Approaches:

- (1) Approaches to the lowest authorized minima including an approach and landing with OEI,
- (2) Missed approach OEI, and
- (3) Non-precision, and circling approaches (if applicable).

NOTE: It is desirable to fly visual and instrument approaches with dissimilar approach and lighting systems.

e. Abnormal/Emergency Operations: (as applicable)

- (1) Wind shear escape,
- (2) TAWS escape,
- (3) TCAS Resolution Advisory,
- (4) HUD failure on approach and its effect on pilot workload and PF/PM duties and responsibilities, and
- (5) Approaches with the aircraft in a non-normal flap configuration.

5.4 Special emphasis flight training shall be conducted in the following areas:

- (1) HUD unique symbology with the autopilot and flight director both off and on, i.e. Flight Path Symbol (FPS), Flight Path Acceleration Cue, speed 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.
- (2) Use of the Angle-of-Attack Limit Indicator and the FPS for approach to stall awareness and its use during a stall recovery.
- (3) Use of the unusual attitude display, the Aircraft Reference symbol, the change to a normal display, and when to transition to the FPS during recoveries.
- (4) Transitioning to Head Down Displays (HDD's) and the inclusion of HDD's in the crosscheck including EICAS displays and other cockpit indications.
- (5) Avoidance of fixation on HUD display and symbology elements, particularly during the landing flare maneuver and appropriate conditions to turn OFF the HUD display.
- (6) Use of the Takeoff Reference Line Indicator and the Aircraft Reference symbol for the pitch rotation target on takeoff and go-around.
- (7) Use of the Glideslope Reference Line and FPS for visual approaches, and in crosswind landing technique.
- (8) HUD brightness settings for different approach lighting systems.
- (9) Use of HUD in conjunction with the sun-visor.

6 HUD INITIAL CHECKING REQUIREMENTS

- 6.1 Upon completion of training, a PIC must be administered a proficiency check conducted in a CL-605 Level C simulator with a daylight visual display, or CL-605 Level D simulator, or on a Rockwell Collins Model 6605 HUD System equipped CL-605 aircraft. This proficiency check may be taken in conjunction with a pilot proficiency check conducted in accordance with FAR Parts 61 or 135 or may be administered as a separate test.
- 6.2 Maneuvers to be evaluated during the HUD proficiency check include as a minimum:
 - a. One takeoff
 - b. One departure procedure
 - c. One instrument approach procedure
 - d. One missed approach
 - e. One landing
- 6.3 SIC's should be checked on PM duties during HUD approaches and emergencies.

7 HUD RECURRENT TRAINING REQUIREMENTS

- 7.1 Selected HUD related ground training subjects as outlined in Paragraph 4 above should be reviewed on a recurrent basis.
- 7.2 As a minimum, selected HUD related flight training maneuvers as listed below should be reviewed on a recurrent basis.
 - a. Stall recognition and recovery
 - b. Unusual attitude recovery from decluttered display
 - c. Takeoff with engine failure at V1
 - d. Approach, either precision or non-precision, with missed approach
 - e. Approach (with crosswind, if available) and landing
 - f. Selected abnormal/emergency maneuvers (ex., HUD AFM procedures, approach and landing with OEI, TCAS RA, TAWS escape, etc.)

8 HUD RECURRENT CHECKING REQUIREMENTS

- 8.1 At least annually, in conjunction with a pilot-in command proficiency check required by FAR Part 61 or FAR Part 135, a PIC must demonstrate proficiency using the Rockwell Collins Model 6605 HUD system by satisfactorily performing the maneuvers listed under paragraph 6.2.

- 8.2 At least annually, second-in-command pilots should be evaluated on Crew Resource Management (CRM) responsibilities and procedures as the pilot monitoring (PM) when the pilot-flying (PF) is conducting HUD operations.

9 HUD CURRENCY REQUIREMENTS

PIC's should have completed at least three takeoffs, approaches, and landings as the pilot flying (PF) using the Rockwell Collins Model 6605 HUD system in the Bombardier Challenger CL-605 airplane, or have completed three takeoffs, approaches, and landings as the PF using the Rockwell Collins Model 6605 HUD system in a CL-605 Level C simulator with a daylight visual display, or CL-605 Level D simulator, within the previous 90 days before acting as the PF using the HUD.

APPENDIX 7 –ROCKWELL COLLINS/CMA-2700 ENHANCED VISION SYSTEM

1 BACKGROUND

In January 2012 the FSB evaluated the CMA-2700 Enhanced Vision System projected onto a Rockwell Collins Model 6605 Head-Up Display (HUD). Although designated an EVS by the manufacturer, this system when installed in a CL-605 aircraft, meets all the requirements of 14 CFR § 91.175(m) as an Enhanced Flight Vision System (EFVS).

Depending on environmental conditions, the FSB found this installation operationally suitable for providing situational awareness for the crew during ground and flight operations and for conducting operations in accordance with 14 CFR § 91.175 (l) and (m).

2 PREREQUISITES FOR EVS TRAINING

As a prerequisite for EVS training, pilots should have successfully completed Rockwell Collins Model 6605 HUD training in the Bombardier Challenger CL-605 Level C or D simulator, or CL-605 aircraft, These EVS requirements assume that a pilot entering an EVS training program is trained and proficient in the use of the Rockwell Collins Model 6605 HUD.

NOTE: This does not preclude the display of the EVS during initial HUD training for purposes of EVS familiarization. However, such familiarization is not creditable toward EVS training as specified in this Appendix.

3 EVS TRAINING - GENERAL

- 3.1 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 programs focus principally upon training events flown in the left seat by the Pilot-In-Command (PIC) as the Pilot Flying (PF). Nevertheless, EVS training in the duties of the Pilot Monitoring (PM) in the right seat is required. SIC EVS familiarization flown in the left seat is recommended.
- 3.2 Flight crewmember training must be accomplished using a CL-605 Level C simulator with a daylight visual display, or a CL-605 Level D simulator, or a CL-605 aircraft equipped with a Rockwell Collins\CMA-2700 Enhanced Vision System. The FSB has determined that each pilot in command should receive a minimum of 2 hours of EVS ground school training, followed by a minimum of 2 hours of EVS flight training, in the left seat, in either an approved CL-605 Level C or D simulator or CL-605 aircraft. (The 2 hours of ground and 2 hours of flight training is an initial training requirement only.)

4 EVS INITIAL GROUND TRAINING

- 4.1 The initial ground training program should include the following elements:
- a. Classroom instruction covering EVS operational concepts, crew duties and responsibilities and operational procedures including preflight, normal and abnormal operations, EICAS messages, use of AFMS, QRH, and checklists, and failure modes.
 - b. Classroom instruction or Computer Based Training (CBT) on Enhanced Vision System annunciators, effect of environmental conditions on EVS image, and comparison of the EVS HUD imagery to that of the copilot's Multifunction Display (MFD).
 - c. A Rockwell Collins Model 6605 Head-up Guidance (HGS) pilot guide, HUD/EVS Aircraft Flight Manual Supplement (AFMS), EVS Pilot training guide, or equivalent training materials which explain EVS components, limitations, modes of operation, EVS annunciators, limit conditions and failures, and which define crew procedures that delineate PF and PM duties, responsibilities, and call-outs during all phases of flight in which EVS operations are anticipated.
- 4.2 Special emphasis ground training shall be conducted in the following areas:
- a. Crew briefings, coordination, and callouts;
 - b. Duties of pilot flying (PF) and pilot monitoring (PM);
 - c. EICAS messages and use of QRH and checklists applicable to EVS operations;
 - d. 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 infrared imagery and that of approach lighting systems should be identified.)
 - e. EVS Visual anomalies such as "noise", "blooming" and "fireplace effect" in rain;
 - f. Appropriate use of the Clear Switch, CAL button, and brightness and contrast knobs on HUD and EVS panel controls;
 - g. Importance of the "design eye position in acquiring the proper EVS image;
 - h. Importance of cross-checking the HUD instrumentation presentations against the EVS visual scene to enable the pilot to recognize malfunctions of the ground based navigational equipment and improper presentation of elements in the visual scene during an approach;
 - i. Limitations of the IR sensor e.g. thermal crossover, LED lights;
 - j. Use of barometric altitude on approach, including FMS temperature correction, if applicable;
 - k. Importance of vertical guidance to enhance situation awareness with respect to obstacle environment;
 - l. Instruction in the use of the autopilot with auto-throttle coupled approaches allowing for better pilot monitoring of the EVS image;

- m. Effective monitoring by PM of EVS imagery presented on the MFD.

5 EVS INITIAL FLIGHT/SIMULATOR TRAINING

- 5.1 Unless integrated with initial type rating training, flight training dedicated to EVS familiarization and proficiency is in addition to other required training elements.
- 5.2 All required approaches utilizing the EVS, should begin no closer than the final approach fix (FAF) for instrument approaches, and should begin no closer than approximately 1,000 feet AGL (3 - 4 NM) to the runway threshold for visual approaches.
- 5.3 The following EVS flight training program is generic in nature and should be considered as a minimum training requirement only.

- a. Ground Operations:

- (1) Initialization of EVS, including operation of EVS brightness and contrast controls.
- (2) Taxi using EVS under various lighting and visibility conditions.

- b. Airwork:

There is no requirement for airwork training using EVS.

- c. EVS Take-offs, Approaches and Landings:

- (1) Normal takeoff and landing with crosswinds.
- (2) Low Visibility Takeoff (minimum RVR)
- (3) Visual approaches at night with minimal lighting (“black hole” approaches) and use of Flight Path Symbol (FPS) and Glideslope Reference Line to achieve desired descent angle.

- d. Instrument Approaches: (IFR/VFR day and night conditions)

- (1) Precision and non-precision straight-in approaches to the lowest published minima with missed approaches or landings.
- (2) Precision and non-precision straight-in approaches to lowest published minima with acquisition of sufficient EVS visibility to continue to 100 feet above Touchdown Zone Elevation (TDZE). Acquisition of required visual references below 100 feet TDZE without the aid of EVS, followed by a landing or missed approach.

e. Abnormal/Emergency Operations:

- (1) Failure of EVS during approach.
- (2) Failure of EVS below published minima but above 100 feet TDZE.

5.4 Special emphasis flight training shall be conducted in the following areas:

- a. Proper use and setting of HUD and EVS contrast and video brightness controls for various ambient conditions;
- b. Crew briefings and callouts with emphasis on the duties of the PF and pilot monitoring;
- c. Importance of the “design eye position” in acquiring the proper EVS image;
- d. Manual and Auto Calibration functions;
- e. Use of the EVS Clear switch; and
- f. Continuation of the approach to 100 feet above TDZE in accordance with 14 CFR § 91.175(l).

6 EVS INITIAL CHECKING REQUIREMENTS

- 6.1 Checking requires a PIC proficiency check conducted in a level 'C' simulator or level 'D' simulator, that has been qualified by the National Simulator Program for HUD and EVS, or on a HUD and EVS equipped CL-605 aircraft. This proficiency check may taken in conjunction with a pilot proficiency check conducted in accordance with 14 CFR parts 61 or 135 or may be administered as a separate test.
- 6.2 Maneuvers to be evaluated during the EVS proficiency check include as a minimum:
 - a. One instrument approach and landing with acquisition of the EVS image before published minima and acquisition of required visual references without the aid of EVS below 100 feet above TDZE.
 - b. One instrument approach with acquisition of the EVS visibility before published minima and failure of the EVS or loss of the EVS image below published minima requiring a missed approach above 100 feet above TDZE.
- 6.3 SIC's must be checked on PM duties during EVS approaches and emergencies.

7 EVS RECURRENT TRAINING AND CHECKING REQUIREMENTS

- 7.1 Selected EVS related ground training subjects as outlined in Paragraph 4 above must be reviewed annually and documented in a manner acceptable to the Administrator.
- 7.2 At least annually, in conjunction with a pilot-in-command proficiency check required by 14 CFR § 61.58 or § 135.297, a PIC must demonstrate proficiency using the Rockwell.

Collins\CMA-2700 Enhanced Vision System by satisfactorily performing the maneuvers listed under paragraph 6.2.

- 7.3 At least annually, second-in-command pilots must be evaluated on crew resource management (CRM) responsibilities and procedures as the pilot monitoring (PM) when the pilot flying (PF) is conducting EVS operations.

8 EVS CURRENCY REQUIREMENTS

PIC's should have completed at least one night takeoff, approach, and landing as the pilot flying (PF) using the Rockwell Collins\CMA-2700 Enhanced Vision System in a Bombardier Challenger CL-605 airplane, or have completed at least one night takeoff, approach, and landing as the PF using the Rockwell Collins\CMA-2700 Enhanced Vision System in a CL-605 Level C or D simulator within the previous 90 days before acting as the PF during EVS operations. The EVS currency requirement may be credited toward the Rockwell Collins Model 6605 HUD currency requirement.

APPENDIX 8 – CL-650 AVIONICS UPGRADE Ver. 1.4.1.3

1 INTRODUCTION

In 2015, Bombardier incorporated Rockwell Collins Proline 21 avionics upgrades into the Challenger 605 production configuration. New production aircraft with these new avionics upgrades installed are now marketed as the Challenger 650. (See para. 3 of this appendix for the descriptions of avionics upgrades).

Most of the avionics upgrades listed in this report are offered via Service Bulletins to upgrade existing in-service Challenger 605 aircraft. For the purposes of this report only, a 605 aircraft with some or all of the avionics upgrades listed in para. 3, is referenced as a 605^(SB). This differentiates a 605 with avionics upgrades as opposed to a 605 aircraft without avionics upgrades.

Note: Training, Checking and Currency requirements for Required Navigation Performance Authorization Required (RNP AR) avionics upgrade to the CL-605^(SB) or CL-650 is addressed in Appendix 9 of this report.

Currently, these avionics upgrades are not available for the Challenger 604.

This appendix only addresses differences 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. Pilots undergoing training as defined in this appendix must already hold a CL-604 pilot type rating.

2 PILOT TYPE RATING REQUIREMENTS

The FSB has determined that the training, checking, and currency levels as a result of avionics service bulletin upgrades to the Challenger 605 (605^(SB)), or acquisition of a new Challenger 650 (650), do not affect the pilot type rating designation.

The pilot type rating designation for the CL-650 or upgraded CL-605 (605^(SB)) is **CL-604**.

3 AVIONICS UPGRADE DESCRIPTION

The avionics upgrades to the CL-605^(SB)/650 (software version 1.4.1.3) include the following:

a. 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.
8. Supports Airway to Airway transitions.

b. Primary Flight Display (PFD)

1. Enlarges upper ADI display.
2. Rescales pitch ladder.
3. Permits selection of FPV (Flight Path Vector) on PFD.

c. 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.
3. Adds increased coverage for XM Weather (optional).

d. TCAS Processor (TSS-4100)

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

e. Synthetic Vision System (SVS)

1. Allows for selection of SVS by the pilot.
2. Provides situational awareness (SA) of surrounding terrain and obstructions for the aircrew during ground and flight operations.
3. Supports SA only. SVS is not to be used for navigation (Ref. Limitations).

f. 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.
2. Controls all weather radar functionally in Automatic mode from takeoff to landing.

g. 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.

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.

4 OPERATIONAL SUITABILITY ASSESSMENT

The FSB has determined that the avionics upgrades defined by software version 1.4.1.3 and denoted in para. 3 of this appendix, i.e. FMS, Primary Flight Display, Integrated Flight Instrument System, TCAS Processor, Synthetic Vision System, MultiScan™ Weather Radar, RNP AR approach capability, and SmartRunway™ and SmartLanding™ are deemed operationally suitable under 14CFR parts 91 and 135*.

* An operational suitability determination does not constitute an operational authorization. Some of the avionics capabilities listed in para. 3 of this appendix may require POI approval.

5 MASTER DIFFERENCE REQUIREMENTS (MDR)

Master Difference Requirements (MDR) for the CL-604, CL-605, CL-605^(SB), and CL-650 are shown in Table 1 of this appendix. Table 1 provisions apply when differences between related aircraft exist which affect crew knowledge, skills, or abilities related to flight safety (e.g. Level A or greater differences).

Note: The MDR table in this appendix omits training, checking and currency requirements for Required Navigation Performance Authorization Required (RNP AR) avionics upgrades. For RNP AR, see Appendix 9 of this report.

6 OPERATOR DIFFERENCE REQUIREMENTS (ODR) TABLES

Operator Difference Requirements (ODR) tables are used to show an operator's compliance method for training program development. ODR tables for operators conducting mixed fleet operations using the CL-604, CL-605, CL-605^(SB), and/or CL-650 (or some combination thereof) are shown in Tables 2 through 5 of this appendix. For operators flying the CL-604, CL-605, CL-605^(SB), or CL-650, these ODR tables have been found acceptable, and therefore, may be approved by POI for a particular operator.

Note: Validation of training, checking, and currency levels between CL-605 to CL-650 (Table 4) and between CL-650 to CL-605 (Table 5) was determined by FSB evaluation.

Assessment of training, checking, and currency levels between CL-604 to CL-605^(SB)/650 (Table 2) and between the CL-605^(SB)/CL-650 to CL-604 (Table 3) was determined through FSB analysis.

7 FSB SPECIFICATIONS FOR TRAINING

When any combination of the CL-604, CL-605, CL-605^{SB} or CL-650 are flown, or if a pilot is upgrading/transitioning from one related aircraft to another, appropriate instruction in design and systems differences is required consistent with MDR provisions listed in Table 1 and ODR provisions from Tables 2 through 5.

From Aircraft	To Aircraft	Highest Training Level Required
604	605 ^{SB}	Level C (with MDR note)
604	650	Level C (with MDR note)
605	605 ^{SB}	Level B
605	650	Level B
605 ^{SB}	604	Level C (with MDR note)
605 ^{SB}	605	Level B
650	604	Level C (with MDR note)
650	605	Level B

Figure 1 describes the accepted methods for various training, checking, and currency levels.

8 FSB SPECIFICATIONS FOR CHECKING

Checking for all combinations of aircraft differences is at Level B. (See Table 1 and Figure 1.) 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.

9 FSB SPECIFICATIONS FOR CURRENCY

Specific systems will have either no currency requirement, or will require periodic self-review when mixed fleet flying is conducted in the different Challenger versions. (See applicable ODR table.)

(If mixed fleet flying is not anticipated and only one variety of Challenger is flown, this requirement does not apply.)

From Aircraft	To Aircraft	Highest Currency Level Required
604	605 ^{SB}	Level B
604	650	Level B
605	605 ^{SB}	Level B
605	650	Level B

605 ^{SB}	604	Level A
605 ^{SB}	605	Level A
650	604	Level A
650	605	Level A

10 SPECIAL EMPHASIS TRAINING

The FSB has determined that following items should receive special emphasis in an approved training program.

- Procedures for Airway to Airway intercepts using the FMS 6200
- Accepted abbreviations for textual inputs from pilot to FMS for CPDLC communications.
- Limitations on the use of SmartRunway™ and SmartLanding™ (RAAS) during normal or abnormal operations.
- Limitations on the use of SVS during flight and approaches.
- ½ bank application during single engine takeoffs (Heading vs. LNAV).

Figure 1. Differences Levels Table

Difference Level	Training	Abbrev.	Checking	Currency
A	Handout	HO	Not applicable (or integrated with next proficiency check)	Not applicable
B	Slide/Tape presentations Tutorial Computer Based Training Stand-up lectures Video Tapes/DVD	S/T TCBT SU VT	Task or System Check	Self-review
C	Interactive Computer Based Training Cockpit System Simulators Cockpit Procedures Trainers Part Task Trainers Flight Training Devices (level 4-5)	ICBT CSS CPT PTT FTD	Partial Proficiency check using device	Designated system(s).
D	Flight training devices (level 6-7) Full Flight Simulators (level D or lower)	FTD 6-7 FFS A-D	Partial Proficiency check using a level 6 or higher FSTD	Designated maneuver(s)
E	Full Flight Simulators (level C or D) Aircraft	FFS C-D ACFT	Proficiency check using level C or D FFS or aircraft	Designated maneuver(s)

Table 1 - MDR TABLE

PILOT TYPE RATING: CL-604	FROM AIRPLANE				
		604	605	605 ^(SB)	650
TO AIRPLANE		604	605	605 ^(SB)	650
	604	-----	See Appendix 1 & 2	C*/B/A	C*/B/A
	605	See Appendix 1 & 2	-----	B/B/A	B/B/A
	605 ^(SB)	C*/B/B	B/B/B	-----	-----
	650	C*/B/B	B/B/B	-----	-----

605 does not have any of Avionics Upgrade Service Bulletins installed as defined in this appendix.

605^(SB) refers to a 605 aircraft with some or all of the Avionics Upgrade Service Bulletins installed as denoted in para. 3 of this Appendix. RNP AR training/checking/currency requirements are addressed in Appendix 9.

650 incorporates all the Avionics Upgrade Service Bulletins as denoted in para. 3 of this appendix in a newly manufactured aircraft. RNP AR training/checking/currency requirements are addressed in Appendix 9.

* Level C Differences training is the highest training level required when transitioning from the Challenger 605^(SB)/650 to the 604. In the case of pilots moving from one related aircraft to the other, operators and training providers must provide pilots with training permitting them to become fully cognizant of the differences in flight deck layout and avionics controls. Interactive computer based training is suitable to impart the necessary knowledge.

However, the operator is responsible to ensure the training is consolidated through the use of a device that provides for tactile manipulation of system related controls and switches, and emulates panel and instrument indications. An acceptable "device" as described in this paragraph is one that replicates the functionality, operation and installation of the Collins Proline Avionics system in the Challenger 604, and may include, but is not limited to, an FTD, aircraft simulator, or aircraft.

Table 2 – ODR Tables

Challenger 604 to Challenger 605^(SB)/650

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

DIFFERENCE AIRCRAFT CL-600-2B16 (605 ^(SB) /650) 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	605/650 Passenger cabin windows increased in size and raised. Over wing emergency exit raised.	No	No	X				A	A
Air Gen	605/650 Aerodynamic tail cone redesigned	No	No	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (605 ^(SB) /650) 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	605/650 Thermostatically controlled pilot and co-pilot heated floor mats installed	No	No	X				A	A
21 Air conditioning & pressurization	605/650 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	605/650 2 nd CPAM installed, standby cabin altitude indicator removed.	No	Minor	X				A	A

DIFFERENCE AIRCRAFT CL-600-2B16 (605 ^(SB) /650) 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	605/650 Cabin temperature control transfer switch (CABIN TEMP CONT XFER) added to air conditioning control panel	No	Minor	X				A	A
22 Auto Flight	605/650 Auto-throttle is standard equipment	No	Minor		X			A	A
22 Auto Flight	605/650 Auto-throttle control panel and switches installed on left glareshield	No	Minor		X			A	A
22 Auto Flight	Optional 605*/650 ½ bank not allowed in LNAV mode below 31,600 ft.	No	Minor		X			B	A
23 Comm	605/650 Radio Tuning Units (RTU) removed, tuning functions performed by CCP/MFD	No	Minor		X			A	A
23 Comm	Optional 605*/650 • FANS 1A+ (CPDLC plus ADS-C) via FMS 6200 CDU.	No	Major		X			B	B
24 Electrical Power	605/650 AC utility switch/light added to Electrical Power panel and minor changes in electrical power distribution	No	Minor	X				A	A
27 Stall Protection	605/650 STALL annunciators removed from glareshield, replaced by STALL indications on PFD	No	Minor	X				A	A
31 Indicating and Recording	605/650 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

DIFFERENCE AIRCRAFT CL-600-2B16 (605^(SB)/650) 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	605/650 EICAS - CAS messages combined into single stack, same stacking philosophy.	No	No	X				A	A
31 Indicating and Recording	605/650 APU temperature and RPM display on MFD is different in format.	No	No	X				A	A
31 Indicating and Recording	605/650 EFIS - Advisory AOA indicator available on each PFD	No	No	X				A	A
31 Indicating and Recording	Optional 605*/650 Capable of supporting optional: Enhanced map displays, XM/Universal weather display, etc.	No	Minor		X			A	B
31 Indicating and Recording	605/650 Over speed test (OVSP TEST) switch removed, No preflight over speed test required.	No	Minor	X				A	A
31 Indicating and Recording	605/650 EICAS – Single warning/caution switch/light on glareshield (one per side)	No	No	X				A	A
31 Indicating and Recording	605/650 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	605/650 Electronic clocks (2) replaced with a single GPS-capable clock	No	No	X				A	A
31 Indicating/Recording	Optional 605*/650 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

DIFFERENCE AIRCRAFT CL-600-2B16 (605 ^(SB) /650) 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
34 Navigation	Optional 605*/650 SBAS Localizer Performance with Vertical Guidance (LPV) 0.3 approach with RF legs capable.	No	Minor		X			A	B
34 Navigation	Optional 605*/650 SmartRunway and SmartLanding	No	Major		X			B	B
34 Navigation	Optional 605*/650 Multi-Scan weather radar with turbulence detection 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.	No	Minor		X			A	B
46 Information Systems	Optional 605*/650 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	605/650 APU Honeywell 36-150 is standard.	No	Minor	X				A	A

Table 3 – ODR Tables
Challenger 605^(SB)/650 to Challenger 604

Note: This table denotes training, checking, and currency requirements when transitioning from either a 605 with Avionics Upgrade Service Bulletins installed (605^(SB)) or a 650, to a Challenger 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	
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 ^(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	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: <ul style="list-style-type: none"> 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
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

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 – 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: <ul style="list-style-type: none"> • 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
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

Table 4 – ODR Tables

Challenger 605 to Challenger 605^(SB)/650

Note: This table denotes 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
	No Design differences.	---	---	---	---	---	---	---	---

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

Table 5 – ODR Tables
Challenger 605^(SB)/650 to Challenger 605

Note: This table denotes training, checking, and currency requirements when transitioning from a Challenger 605^(SB) or 650 to a Challenger 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
	No Design differences	---	---	---	---	---	---	---	---

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
31 Indicating/Recording	Basic 605 is not Synthetic Vision System capable.	No	No	X				A	A
34 Navigation	Basic 605 FMS 6000 does not support: <ul style="list-style-type: none"> • 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
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

APPENDIX 9 – CL-605^(SB)/CL-650 WITH REQUIRED NAVIGATION PERFORMANCE AUTHORIZATION REQUIRED (RNP AR) 0.3

1 INTRODUCTION

As a prerequisite to RNP AR training, checking, and currency requirements as defined in this appendix, pilots must have met the requirements of Appendix 8 for qualification in CL-605^(SB) or CL-650 aircraft.

This appendix only applies to CL-605^(SB) and CL-650 aircraft that have the avionics upgrades installed as defined in Appendix 8 and has RNP AR avionics capability for which pilot training, checking, and currency is sought.

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

2 PILOT TYPE RATING REQUIREMENTS

The RNP AR avionics upgrade to CL-605^(SB) or CL-650 aircraft does not change the pilot type rating. The pilot type rating remains **CL-604**.

3 RNP AR AVIONICS UPGRADE DESCRIPTION

RNP AR 0.3 approach capability is integrated into the Rockwell Collins FMS 6200 and 1.4.1.3 software versions. This capability may be installed on existing CL-605 aircraft via Service Bulletin (CL-605^(SB)), or come installed in newly manufactured CL-650 aircraft.

4 OPERATIONAL SUITABILITY ASSESSMENT

The FSB has determined that RNP AR approach capability installed in the CL-605^(SB) or CL-650 aircraft is operationally suitable under 14 CFR parts 91 and 135.

5 FSB SPECIFICATIONS FOR TRAINING

Applicability: In conducting RNP AR approaches specified 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.

Initial Training: For CL-605^(SB) or CL-650 aircraft with RNP AR approach capability, training programs must fully comply with the requirements of Advisory Circular 90-101A (as amended), “Approval Guidance for RNP Procedures with AR”.

Initial ground and flight training must encompass all elements applicable to the CL-605^(SB) or CL-650 as defined in AC 90-101A, Appendix 4 “Operational Considerations” and Appendix 5 “Training”.

Initial flight training in a qualified FSTD or CL-605^(SB) or CL-650 aircraft¹ must include:

- Four RNP AR² approaches: Two as PF and Two as PM
- Two of the four RNP AR approaches must be flown to the DA.
- Two of the four RNP AR approaches must be flown to an RNP missed approach.
- One of the four RNP AR approaches must include an interrupt with vectors to resume the approach and,
- One of the four RNP AR approaches must include a hold at an IAF or transition fix.

(¹ Flight training when conducted in the aircraft must be in VMC)

(² Two of the four approaches must have RF legs.)

Note: 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.

Recurrent training:

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

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

- Two RNP AR³ approaches: One as PF and One as PM
- One of the two RNP AR approaches must be flown to the DA.
- One of the two RNP AR approaches must to flown to an RNP published missed approach.
- 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.

(³ One of the two approaches must have RF legs.)

Note 1: 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.

Note 2: An RNP AR procedure may be substituted for any precision or non-precision approach in a recurrent training program required under 14 CFR § 135.351

6 SPECIAL EMPHASIS TRAINING

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

- Required equipment for RNP AR approaches (MEL review and inflight equipment failure)
- Missed approach procedures on RF legs
- Manually flown approaches and missed approaches
- Temperature compensation

7 FSB SPECIFICATIONS FOR CHECKING

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

Initial and Recurrent Checking requirement:

RNP AR checking in a qualified FSTD or CL-605^(SB) or CL-650 aircraft must include:

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

(¹ One of the approaches must have RF legs.)

Instrument Proficiency Check Requirement under 14 CFR § 135.297 or PIC Proficiency Check under 14 CFR § 61.58

For PIC's qualified and authorized for RNP AR approaches, at least one RNP AR approach with RF legs must be demonstrated during a 14 CFR § 135.297 Instrument Proficiency Check or during a PIC Proficiency Check under 14 CFR § 61.58. Additionally, the PM during the check must be RNP AR current and qualified in accordance with this appendix.

Note 1: An RNP AR approach may be substituted for any required precision or non-precision approach on any recurrent or proficiency check required under 14 CFR parts 135 or 61.

Note 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.

8 FSB SPECIFICATIONS FOR 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 9 below or a CL-605^(SB) with RNP AR capability or CL-650 aircraft.

Any checking under 14 CFR part 135 or part 61 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 recurrent training defined in para 5 “FSB Specifications for Training” and checking elements defined in para. 6 “FSB Specifications for Checking” in this appendix.

9 FSB SPECIFICATIONS FOR FLIGHT SIMULATION TRAINING DEVICES (FSTD)

Flight Simulation Training Devices (FSTD) for RNP AR pilot training, checking, and currency must meet the requirements of National Simulator Program, FSTD Qualification Guidance Bulletin 09-05.

In addition, all flight training, checking, and currency requirements as denoted in this appendix can be accomplished in a CL-605^(SB) with RNP AR approach capability or CL-650 aircraft.

TABLE 1- MDR TABLE

PILOT TYPE RATING: CL-604	FROM AIRPLANE			
TO AIRPLANE			605^(SB)	650
			SB with RNP AR capability	Equipped with RNP AR capability
	605^(SB)	Seeking RNP AR authorization	D/D/D	D/D/D
	650	Seeking RNP AR authorization	D/D/D	D/D/D

TABLE 2 - ODR TABLE

Note: This table denotes training, checking, and currency levels for RNP AR operations in a Challenger 605^(SB) with RNP AR approach capability and Challenger 650.

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