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Flight Standardization Board (FSB) Report

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Learjet – 60XR **LR/60/60XR**

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REVISION RECORD

REVISION NUMBER	SECTION	PAGE NUMBERS	DATE
Original	All	All	06/04/2007
1	1,4,5,6,7,8,9,10,A,C,D	1,3,4,5, 9,10,11, A-1, C-1, D	05/07/2010
2	6, 8, 9, 10,12, A, B, D	1, 4, 9, 10, 11, 12, A-1, B-1, B-4, B-6, D-1, D-2, D-5, D-6	08/25/2011

Highlights of Change

Revision 1:	Entire Document Appendix D	Updated flight crew and crew to 14 CFR Part 1 definition crewmember(s) Added Report for IFIS-5000 Class 3 Electronic Flight Bag (EFB).
Revision 2:	Entire Document Section 6 Section 8 Section 9 Section 10 Section 12 Appendix A Appendix B Appendix D	Updated Revision number on all Headers and Revision Record Updated Difference Level Terminology and Differences Table Updated Training Specifications Updated Checking Specifications Updated Currency Specifications Updated Guidance Documents Updated MDR Table Updated ODR Table and Navigation System Updated Paperless Requirements

1. PURPOSE AND APPLICABILITY

The primary purpose of this Flight Standardization Board (FSB) Report is to specify the minimum FAA master training, checking and currency requirements applicable to crewmembers operating the Bombardier Learjet Model 60XR airplane, hereinafter called the LR-60XR. This Report can provide guidance to operators, who will be operating the LR-60XR under Title 14 Code of Federal Regulations (14 CFR) Part 91, including Subpart K, and Part 135.

The guidelines in this Report apply to: Operations Inspectors, Principal Operations Inspectors (POIs), Training Center Program Managers (TCPMs), Aircrew Program Managers (APMs), Part 135 Air Carrier Check Airmen and Instructors, Airline Transport Pilots instructing in air transportation service, Certificated Flight Instructors (CFIs), Aircrew Program Designees (APDs), Training Center Evaluators (TCEs) and other training providers.

The FSB will complete evaluations of future changes to the LR-60 and LR-60XR and derivative or variant models. Future aircraft changes that the FSB may need to evaluate include, but are not limited to; engine changes, systems and instrumentation changes, and the installation of new systems. The FSB will determine the impact of future installations on training, checking and currency and amend the FSB Report as needed.

The contents of this FSB Report are applicable on the effective date of its final approval and will remain effective unless amended, superseded, or withdrawn by subsequent FSB determinations.

2. ACRONYMS

Relevant acronyms used in this FSB Report are defined as follows:

14 CFR	Title 14, Code of Federal Regulations
AC	Advisory Circular
ACO	Aircraft Certification Office
ACP	Autopilot Control Panel
AEG	Aircraft Evaluation Group
AFM	Airplane Flight Manual
AFS	Autoflight System
APD	Aircrew Program Designee
APM	Aircrew Program Manager
ATP	Airline Transport Pilot
CAS	Crew Alerting System
CFI	Certificated Flight Instructor
CHDO	Certificate Holding District Office
CPT	Cockpit Procedures Trainer
CRT	Cathode Ray Tube
DME	Distance Measuring Equipment

EASA	European Aviation Safety Agency
EIS	Engine Indication System
EFIS	Electronic Flight Information System
ESIS	Electronic Standby Instrument System
FAA	Federal Aviation Administration
FADEC	Full Authority Digital Engine Controller
FMS	Flight Management System
FSB	Flight Standardization Board
FSDO	Flight Standards District Office
FTD	Flight Training Device
ICAO	International Civil Aviation Organization
IFIS	Integrated Flight Instrument System
ITT	Interturbine Temperature
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MCRs	Master Common Requirements
MDRs	Master Difference Requirements
MFD	Multifunction Display
MKC-AEG	Kansas City Aircraft Evaluation Group
NSP	National Simulator Program
ODRs	Operator Difference Requirements
PFD	Primary Flight Display
PIC	Pilot in Command
POI	Principal Operations Inspector
PTS	Practical Test Standards
QRH	Quick Reference Handbook
RTU	Radio Tuning Unit
RVSM	Reduced Vertical Separation Minimum
SIC	Second in Command
STC	Supplemental Type Certificate
TCDS	Type Certificate Data Sheet
TCE	Training Center Evaluator

3. BACKGROUND

The LR-60 is certified in accordance with 14 CFR Part 25, with a minimum crew of two pilots. The LR-60XR is a Model LR-60 with a Rockwell Collins Pro Line 21 avionics suite and a new interior. The LR-60XR project was completed through two separate supplemental type certificates (STCs) coordinated with the Wichita Aircraft Certification Office (ACO).

There has been no revision to Type Certificate Data Sheet (TCDS) Number A10CE with approval of the LR-60XR designation. The LR-60 presently shares a TCDS with the Learjet 20/30/50 Series models. The TCDS was updated including the LR-60XR configuration changes.

The restyled interior, which includes redesigned cabin work areas with increased legroom, light emitting diode (LED) lighting and a new audio-visual system, was completed through STC Number ST01422WI-D.

The installation of the new avionics suite was completed through STC Number ST01402WI-D. The avionics STC includes both the removal of existing equipment and installation of new equipment. The primary changes to the LR-60XR avionics system and other cockpit displays are listed in the tables below:

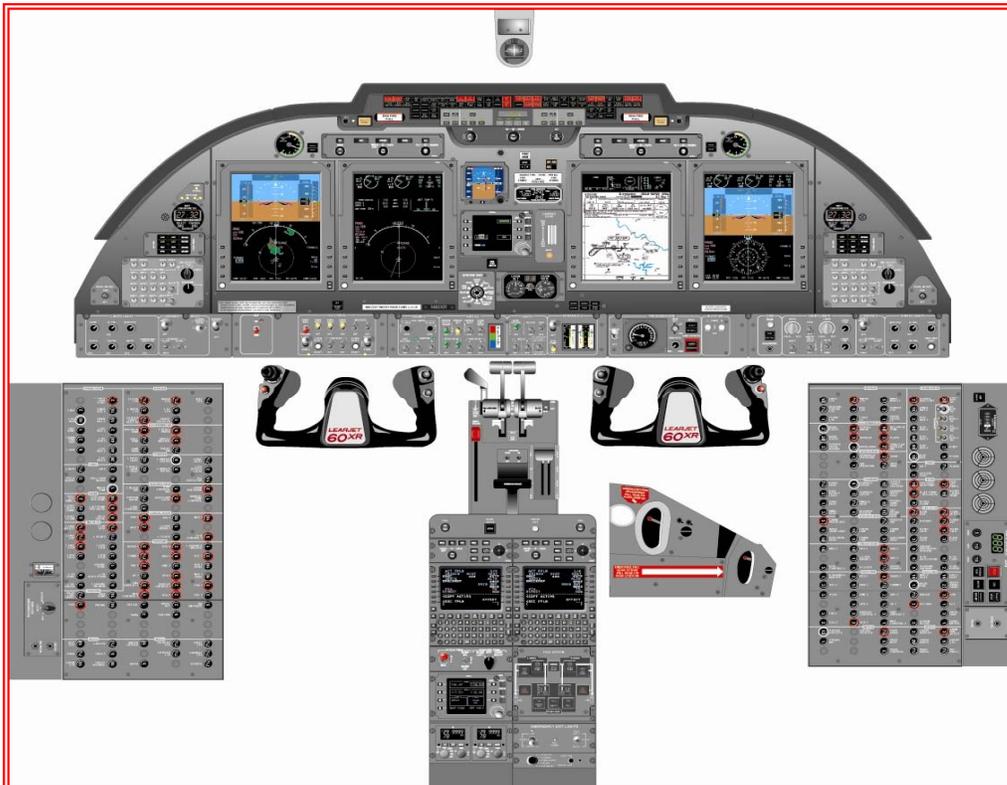
Present Installed Equipment on Learjet LR-60	New Equipment Installed on Learjet LR-60XR
Pro Line 4 Avionics System	Pro Line 21 Avionics System with IFIS
Universal Avionics UNS-1 FMS	Rockwell Collins FMS-5000
FCS-850 Flight Director/Autopilot	FCS-3000 Flight Director/Autopilot
Pro Line EFIS 6-inch X 7-inch CRTs	Pro Line EFIS 8-inch X 10-inch LCD Displays
Mechanical Engine Indicating Gauges	Digital/Analog Engine Indications on MFD
Electro-Mechanical Flt. Control Indications	EIS Flight Control Displays
Landing Gear Annunciator Lamps	EIS landing Gear Display
Electro-Mechanical Temp Control Valve Position Indicators	EIS Crew/Cabin Temp Control Valve Position Display
Electro-Pneumatic Standby Instruments	Electronic Standby Instrument System

Additional Avionics Changes on the Learjet LR-60XR
Upgraded Dual AHRS and EFIS System
Upgraded and Repositioned RTU-4220s
Single or Dual File Server Unit & Approach Charts on MFD
Added Display Control Panels above PFD/MFD
Added Cursor Control Panels on Pedestal
Added a Heading, Speed, Altitude Panel
Integrated Avionics Processing System
Upgraded Mark V EGPWS

The LR-60XR also includes several other minor equipment changes and upgrades. Pictorials of the LR-60 and the LR-60XR flight decks are illustrated on the following page.



LR-60 FLIGHT DECK LAYOUT



LR-60XR FLIGHT DECK LAYOUT

4. PILOT TYPE RATING DETERMINATION

In accordance with 14 CFR Parts 1 and 61, the pilot type rating designation for the LR-60XR variant is **LR-60**, the same type rating assigned to the Learjet Model 60, which is the base aircraft.

5. MASTER COMMON REQUIREMENTS (MCRs)

MCRs are requirements applicable to crewmember qualification which pertain to all variants of the same type or related types. The LR-60XR is a LR-60 with a new avionics suite and redesigned interior. The FSB has determined that takeoff and landing performance, flight characteristics, and handling qualities are identical to the LR-60.

6. MASTER DIFFERENCE REQUIREMENTS (MDRs)

MDRs are requirements applicable to crewmember qualification, which pertain to differences between variants of the same or related type and are listed in Appendix A for the LR-60 and LR-60XR.

MDRs apply when differences between a base aircraft and a variant, or differences between two variants, affect crewmember knowledge, skills, or abilities related to flight safety. These differences are expressed in Difference Levels; A through E and require training with the use of minimum level training methods, devices, or equipment as listed in the Difference Level Table illustrated below.

Training Methods, Devices and Equipment		Difference Level
HO	= Handout	A
ST	= Slide / Tape presentations	B
TCBI	= Tutorial Computer Based Instruction	
SU	= Stand-Up Instruction	
VT	= Video Tapes	
ICBI	= Interactive Computer Based Instruction	C
CSS	= Cockpit System Simulators	
CPT	= Cockpit Procedures Trainers	
PTT	= Part Task Trainers	
FTD 2-5	= Flight Training Devices (level 2-5)	
FTD 6-7	= Flight Training Devices (level 6-7)	D
SIM A-B	= Simulators (level A or B)	
SIM C-D	= Simulators (level C or D)	E
ACFT	= Aircraft	

7. OPERATOR DIFFERENCE REQUIREMENTS (ODRs)

ODRs are operator specific requirements necessary to address differences between a base aircraft and one or more variants in a transition training program that list compliance methods relative to training, checking and currency. ODR tables consist of design, maneuver and system difference tables.

ODR tables are an acceptable means to comply with MDRs based on the differences and the compliance methods shown. For operators transitioning from the LR-60 to the LR-60XR, the ODR tables in this FSB Report are acceptable and may be approved by POIs for a specific operator.

The ODR tables, submitted by Bombardier Learjet, address proposed training, checking and currency differences when flight crews are qualified in the LR-60 and are transitioning to the LR-60XR. ODR tables for crewmembers transitioning from the LR-60XR to the LR-60 were not available at the time the FSB was completed, but were considered by the FSB and have been appropriately addressed in this Report.

The ODR tables in this Report are not the only acceptable means of compliance. Operators who wish to establish a different means of compliance, must request FAA approval through their assigned POI for ODR tables unique to their fleet. The POI should coordinate this action with the FSB chairman and AFS-200.

ODR tables are included in Appendix B.

8. FSB SPECIFICATIONS FOR TRAINING

Operator training in the LR-60XR must emphasize the differences between the Pro Line 4 system and the Pro Line 21 system. Operator differences training should be accomplished in accordance with the MDR table in Appendix A of this Report.

The FSB recommendation for the minimum amount of differences ground training and systems integration training when transitioning from the LR-60 to the LR-60XR is:

Day 1	8 Hours Ground Training
Day 2	4 Hours Systems Integration
	2 Hours Line Operational Evaluation

The FSB recommends that systems integrations training be set at Level C using the minimum devices that meet the Level C requirements specified by the Difference Level Table on Page 9. Programming the Rockwell Collins FMS-5000 must be mastered before a crewmember advances to the line operational evaluation.

Crewmembers trained in the LR-60XR and transitioning to the LR-60, the minimum training level is set at Level C. No minimum amount of time has been recommended.

SIC training is mandatory in accordance with 14 CFR Section 61.55 for airmen, who will be serving as a SIC on the LR-60XR in U.S. operations.

SIC training that will lead to a Second-in-Command pilot type rating in the LR-60XR will also have to be completed for pilots assigned SIC duties, unless they hold the LR-60 type rating. A Second-in-Command type rating and training is required by 14 CFR Section 61.55 (a) (3), (d), and (e), for international operations in accordance with International Civil Aviation Organization (ICAO) standards.

9. FSB SPECIFICATIONS FOR CHECKING

The minimum checking level for the LR-60XR is set at Level C. During checking, crewmember knowledge of the Pro Line 21 System, as well as proficiency in programming the FMS-5000 System, must be evaluated.

For crewmembers trained in the LR-60XR and transitioning to the LR-60, the checking level is set at Level B.

10. FSB SPECIFICATIONS FOR CURRENCY

The currency level for the LR-60XR is set at Level C or Level A when meeting listed requirements in next paragraph. If crewmembers have not operated the LR-60XR within the preceding 6 calendar months, operators should re-establish currency for their crewmembers by providing training that meets the minimum requirements in the FSB Specifications for Training (Section 8). Any FAA approved LR60XR Initial / Upgrade / Re-Qualification or Recurrent training course and the satisfactory completion of a Proficiency / Competency check will satisfy the requirements for re-establishing currency.

If crewmembers have operated the LR-60XR in the past 6 calendar months and retained system knowledge and proficiency, the currency level is set at Level A. If a Proficiency / Competency check is satisfactorily completed in the month after the crewmembers due month (grace month late), the currency at will continue at Level A.

For crewmembers trained in the LR-60XR and transitioning to the LR-60, the currency level is set at Level A.

14 CFR Part 142 Training Center Instructors and Evaluators actively conducting LR-60XR training need only meet the requirements of 14 CFR Part 142. When conducting flight training in an actual aircraft, crewmember currency requirements listed above are applicable.

11. FSB SPECIFICATIONS FOR DEVICES AND SIMULATORS

All requests for the use of training devices or flight simulators in an operator's training program, or at a Part 142 approved training center or other training provider should be addressed to the appropriate FSDO. Requests for device or simulator approval should be made through the POI. Guidance is available in 14 CFR Part 61, FAA Order 8900.1 and AC 120-40B. POIs should seek additional assistance through the FAA's National Simulator Program (NSP) Office.

The training and checking requirements of 14 CFR Part 61, Part 91 Subpart K and Part 135, as well as the ATP and Aircraft Type Rating PTS, allow partial or full credit in approved training devices and simulators.

The FSB recommends that systems integration training be accomplished in a simulator, or the aircraft with ground power available.

Bombardier Training center at DFW Airport has both a LR-60 and a LR-60XR Level D Simulator available for training.

12. AIRCRAFT REGULATORY COMPLIANCE

AIRCRAFT REGULATORY COMPLIANCE CHECKLIST – The Aircraft Regulatory Compliance Checklist is beneficial to the FAA Certificate Holding District Office (CHDO) and assigned principal inspectors because it identifies regulatory and operational requirements for which compliance has already been demonstrated to the FAA for a particular type aircraft or variant model. The LR-60 has been in service since 1993 and has met all regulatory operational requirements. The LR-60XR FSB did not complete a new regulatory compliance checklist for the LR-60XR, nor did it update an existing compliance checklist.

It is the responsibility of the CHDO to review compliance with FAA rules, policies and processes before the LR-60XR is approved for entry into commercial service.

PROVING AND VALIDATION TESTS – Proving and validation tests, which may be required by an operator to comply with the requirements of 14 CFR 135.145, should be conducted in accordance with FAA Order 8900.1, Volume 3, Chapter 29. For mixed fleet operators, a representative amount of proving flights should be completed in the LR-60XR.

FORWARD OBSERVER SEAT – A forward observer seat on or near the flight deck, equipped with a headset or speaker, seat belt, oxygen, ventilation and lighting, is required. This seat is provided for use during enroute inspections as required by 14 CFR 135.75 and for the administration of flight tests leading to pilot certification or operating privileges. The most forward cabin seat in the LR-60 and LR-60XR is used for this purpose.

13. ALTERNATE MEANS OF COMPLIANCE TO THIS REPORT

The FSB chairman should be consulted by the POI when alternate means of compliance, other than those specified in this report, are proposed. The FAA General Aviation and Commercial Division, AFS-800, or the FAA Air Transportation Division, AFS-200, must approve alternate means of compliance. 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.

APPENDIX A – MDR TABLE

AIRPLANE TYPE RATING: LR-60		FROM AIRPLANE	
TO AIRPLANE		LR-60	LR-60XR
	LR-60	N/A	C/B/A
	LR-60XR	C/C/C*	N/A

Level C differences training is the highest training level required for the LR-60 and the LR-60XR. When crewmembers are assigned from one aircraft to the other, operators and training providers must ensure that the level of training given is adequate for crewmembers to fully understand the differences between the flight deck layouts and avionics system controls in the LR-60 and the LR-60XR.

Interactive computer based instruction is suitable to instill the necessary knowledge. Operators and training providers are responsible for the availability of equipment or devices, with simulated panel and instrument indications which allows the manipulation of system controls and switches by all crewmembers during training. Acceptable equipment or devices are those that replicate the installation, functionality and operation of the Rockwell Collins Pro Line 4 and Pro Line 21 Avionics Systems, as appropriate, in the LR-60 and the LR-60XR airplanes. Examples of suitable equipment or devices that meet this intent are CPTs, FTDs, simulators and the aircraft.

* The currency level for crewmembers, who are trained and qualified in both the LR-60XR and the LR-60, or who are engaged in mixed fleet flying, is Level C if they have not operated the LR-60XR in the preceding 6 calendar months. If crewmembers have not operated the LR-60XR, operators and training providers must ensure they receive the minimum training required by this report to reestablish currency in the LR-60XR. If crewmembers have operated the LR-60XR in the past 6 calendar months and retained system knowledge and proficiency, the currency level is set at Level A.

APPENDIX B – ODR TABLES

Operator Differences Requirements

Definitions		ODR Training Level
HO	= Handout	A
ST	= Slide / Tape Presentation	B
TCBI	= <u>Tutorial</u> Computer Based Instruction	
SU	= Stand-Up Instruction	
VT	= Video Tape	
ICBI	= <u>Interactive</u> Computer Based Instruction	C
CSS	= Cockpit System Simulator	
CPT	= Cockpit Procedures Trainer	
PTT	= Part Task Trainer	
FTD 2-5	= Flight Training Device (level 2-5)	
FTD 6-7	= Flight Training Device (level 6-7)	D
SIM A-B	= Simulator (level A or B)	
SIM C-D	= Simulator (level C or D)	E
ACFT	= Aircraft	
<p><u>NOTES</u></p> <p>An “X” in an ODR table column indicates that any of the training methods listed for that level are the minimum acceptable level. If a specific instruction method is specified in an ODR table column, it must be used.</p> <p>“ C* ” in the Checking column (CHKG) of the ODR Tables requires use of training devices specified in “TRAINING LVL C” column of ODR table</p> <p>More ODR Checking and Currency level definitions may be found in AC 120.53.</p>		

1. ODR Tables – Learjet 60 to Learjet 60XR

BASE AIRCRAFT: Learjet 60 DIFFERENCE AIRCRAFT: Learjet 60XR				COMPLIANCE METHOD					
APPROVED BY (POI) _____									
				TRAINING				CHKG / CURR	
DESIGN	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHKG	CURR
Weights	Max Ramp Weight- Unchanged Max Take-off Weight- Unchanged Max Zero Fuel Weight- Unchanged	No	No	X				A	A
Dimensions	No Change	No	No	X				A	A

BASE AIRCRAFT: Learjet 60 DIFFERENCE AIRCRAFT: Learjet 60XR				COMPLIANCE METHOD					
APPROVED BY (POI) _____									
				TRAINING				CHKG / CURR	
MANEUVER	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHKG	CURR
PTS Maneuvers	No Changes	No	No	X				A	A

BASE AIRCRAFT: Learjet 60 DIFFERENCE AIRCRAFT: Learjet 60XR									
APPROVED BY (POI) _____									
				TRAINING				CHKG / CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHKG	CURR
21 Air Conditioning	EIS Crew/Cabin Temp Control Valve Position Display replaces electromechanical Crew/Cabin Temp Control Valve Position Indicators	No	Minor	X				A	A
22 Auto Flight	Pro Line 21 Coupled Autopilot replaces Pro Line 4 Independent Autopilot	No	Minor			X		B	A
22 Auto Flight	Flight Control Panel (FCP) with ALTS and LVL CHG modes removed and SPD mode changed to FLC replaces Flight Control Panel (FCP) with ALTS, LVL CHG and SPD modes	No	Minor		X			A	A
23 Communications	RTU 4220 Radio Tuning Units replace RTU 870 Radio Tuning Units.	No	Minor		X			A	A
23 Communications	EIS SELCAL Display replaces SELCAL Annunciator panel	No	Minor	X				A	A
24 Electrical Power	EIS Electrical Display replaces Power Monitor	No	Minor	X				A	A
27 Flight Controls	EIS Pitch, Aileron and Rudder Trim Display replaces Electromechanical Pitch, Aileron and Rudder Trim Indicators	No	Minor	X				A	A
27 Flight Controls	EIS Flaps and Spoilers Display replaces electromechanical Flaps and Spoilers indicator	No	Minor	X				A	A
32 Landing Gear	EIS Gear Display replaces Gear Annunciator Lamps	No	Minor	X				A	A
33 Lights	Circuit Breaker and Integral cockpit panel lighting and some switch/lights changed to LEDs	No	No		X			A	A
34 Navigation	Pro Line 21 EFIS 8x10 displays replace Pro Line 4 EFIS 6x7 displays. Air Data Reference Panel (ARP), Attitude Awareness Panel (AAP), Course Heading Panel (CHP) removed, replaced by Display Control Panel (DCP) (On-Side PFD), Cursor Control Panel (On-Side MFD), Heading Speed Altitude Panel (HSA) and Course Panel	No	Major			X		B	A
34 Navigation	Pro Line 21 Attitude Heading System (AHS) replaces Pro Line 4 Attitude Heading System (AHS)	No	Minor	X				B	A

BASE AIRCRAFT: Learjet 60 DIFFERENCE AIRCRAFT: Learjet 60XR									
APPROVED BY (POI) _____									
				TRAINING				CHKG / CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHKG	CURR
34 Navigation	Rockwell Collins Pro Line 21 FMS replaces Universal FMS	No	Major			X		C	C / A
34 Navigation	Pilot/Copilot EFIS Control Panel modified	No	Minor		X			A	A
34 Navigation	Standby instruments, Electro-pneumatic standby Altitude/Airspeed and Attitude instruments replaced by an Electronic Standby Instrument System (ESIS)	No	Minor	X				A	A
34 Navigation	Backup RTU HSI display replaces Sensor Display Unit (SDU) and Sensor Display Driver (SDD)	No	Minor	X				A	A
34 Navigation	Integrated Flight Information System: IFIS-5000	No	Major			X		C	C
34 Navigation	Capable of supporting optional: Enhanced map displays, XM/Universal weather display, etc.	No	Minor	X				A	A
77 Engine Indicating	EIS Engine Display replaces electromechanical engine indicators (N1, N2, ITT, OP, OT and FF)	No	Minor	X				A	A
77 Engine Indicating	Backup Engine Indications on the RTU	No	No	X				A	A
78 Engine Control	EIS Thrust Reverser (TR), Engine SYNC and APR annunciations replace TR, SYNC and APR annunciator Lamps in glare shield Warning Panel	No	Minor		X			A	A

2. ODR Tables – Learjet 60XR to Learjet 60

BASE AIRCRAFT: Learjet 60XR DIFFERENCE AIRCRAFT: Learjet 60				COMPLIANCE METHOD					
APPROVED BY (POI) _____									
				TRAINING				CHKG / CURR	
DESIGN	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHKG	CURR
Weights	Max Ramp Weight- Unchanged Max Take-off Weight- Unchanged Max Zero Fuel Weight- Unchanged	No	No	X				A	A
Dimensions	No Change	No	No	X				A	A

BASE AIRCRAFT: Learjet 60XR DIFFERENCE AIRCRAFT: Learjet 60				COMPLIANCE METHOD					
APPROVED BY (POI) _____									
				TRAINING				CHKG / CURR	
MANEUVER	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHKG	CURR
PTS Maneuvers	No Changes	No	No	X				A	A

BASE AIRCRAFT: Learjet 60XR DIFFERENCE AIRCRAFT: Learjet 60									
APPROVED BY (POI) _____				TRAINING				CHKG / CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHKG	CURR
21 Air Conditioning	Electromechanical Crew/Cabin Temp Control Valve Position Display replaces EIS Crew/Cabin Temp Control Valve Position Indicators	No	Minor	X				A	A
22 Auto Flight	Pro Line 4 Coupled Autopilot replaces Pro Line 21 Independent Autopilot	No	Minor			X		B	A
22 Auto Flight	Flight Control Panel (FCP) with ALTS and LVL CHG modes added and FLC mode changed to SPD replaces Flight Control Panel (FCP) with FLC modes	No	Minor		X			A	A
23 Communications	RTU 870 Radio Tuning Units replaces RTU 4220 Radio Tuning Units.	No	Minor		X			A	A
23 Communications	SELCAL Annunciator panel replaces EIS SELCAL Display	No	Minor	X				A	A
24 Electrical Power	Electrical Power Monitor replaces EIS Electrical Display	No	Minor	X				A	A
27 Flight Controls	Electromechanical Pitch, Aileron and Rudder Trim Indicators replaces EIS Pitch, Aileron and Rudder Trim Display	No	Minor	X				A	A
27 Flight Controls	Electromechanical Flaps and Spoilers indicator replaces EIS Flaps and Spoilers Display	No	Minor	X				A	A
32 Landing Gear	Gear Annunciator Lamps replaces EIS Gear Display	No	Minor	X				A	A
33 Lights	Circuit Breaker and Integral cockpit panel lighting and some switch/lights changed to bulbs and electroluminescent lighting.	No	No		X			A	A
34 Navigation	Pro Line 4 EFIS 8x10 displays replaces Pro Line 21 EFIS, 4 6x7 displays. Air Data Reference Panel (ARP), Attitude Awareness Panel (AAP), Course Heading Panel (CHP) replaces, Display Control Panel (DCP) (On-Side PFD), Cursor Control Panel (On-Side MFD), Heading Speed Altitude Panel (HSA) and Course Panel	No	Major			X		B	A
34 Navigation	Pro Line 4 Attitude Heading System (AHS) replaces Pro Line 21 Attitude Heading System (AHS)	No	Minor	X				B	A

BASE AIRCRAFT: Learjet 60XR DIFFERENCE AIRCRAFT: Learjet 60									
APPROVED BY (POI) _____									
				TRAINING				CHKG / CURR	
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHKG	CURR
34 Navigation	Rockwell Collins Pro Line 21 FMS replaced by Universal FMS	No	Major			X		A	A
34 Navigation	Pilot/Copilot EFIS Control Panel modified	No	Minor		X			A	A
34 Navigation	Standby instruments, Electro-pneumatic standby Altitude/Airspeed and Attitude instruments replaces Electronic Standby Instrument System (ESIS)	No	Minor	X				A	A
34 Navigation	Backup RTU HSI display replaced by Sensor Display Unit (SDU) and Sensor Display Driver (SDD)	No	Minor	X				A	A
34 Navigation	Optional: Enhanced map displays, XM/Universal weather display, etc. not available	No	Minor	X				A	A
77 Engine Indicating	EIS Engine Display replaced by electromechanical engine indicators (N1, N2, ITT, OP, OT and FF)	No	Minor	X				A	A
77 Engine Indicating	Backup Engine Indications on the RTU not available.	No	No	X				A	A
78 Engine Control	EIS Thrust Reverser (TR), Engine SYNC and APR annunciations replaced by TR, SYNC and APR annunciator Lamps in glare shield Warning Panel	No	Minor		X			A	A

APPENDIX C – BOARD RECORD

BOARD COMPOSITION – The Initial FSB for the LR-60XR consisted of two FAA operations inspectors, and the FSB chairman. Both operations inspectors and the FSB chairman are rated in the LR-60 and were current at the time the FSB was completed. One inspector is a FAA national resource inspector in the LR-60.

APPLICANT’S PROPOSAL – The applicant, Bombardier Learjet, submitted ODR tables that proposed Level C training, Level B checking and Level A currency.

TESTS – The LR-60XR FSB met in Wichita, Kansas, from January 31 to February 2, 2007. Both FAA inspectors, who were the test subjects and the FSB Chairman, underwent systems ground training and systems integration training.

The instruction, which was provided by Bombardier Training Center instructors, included 12 hours of ground training and seven hours of systems integration training. Four hours of systems integration training was completed through the use of a computer interactive system and the remaining three hours was completed in the aircraft with a ground power unit operating.

Following a review of the ODR tables and the manufacturer’s proposal, which were submitted by Bombardier Learjet, it was decided that the T-1 test could not be administered. Since the handling qualities of the LR-60 base aircraft and the LR-60XR variant are identical, the T-2 test was not applicable. Following training, the T-3 test, as specified by AC120-53, was administered.

The two test subjects each flew selected maneuvers from the ATP/Type Rating PTS and completed a line-oriented flying segment. The FSB Chairman graded each of the tasks and maneuvers on a 1 to 5 scale to establish a basis for the final evaluation of the differences training proposal.

Bombardier Learjet did not submit ODR tables for differences training when crewmembers are trained initially in the LR-60XR and then transition to the LR-60 until after the FSB was completed. Based on previous operating experience in the LR-60 and the training completed in the LR-60XR by FSB Board members, differences levels for training, checking and currency were evaluated and included in the MDR table in Appendix 1. The FSB agreed with the manufacturer’s proposed training differences as submitted.

TEST RESULTS – During the conduct of maneuvers, the FSB noted no significant differences and accepted Bombardier Learjet’s proposal with only two exceptions.

First, the Board recommended an additional four-hour block of systems integration training be added and a four-hour block of ground instruction be deleted for crewmembers transitioning from the LR-60 to the LR-60XR. The aggregate number of hours of differences training remains 24, but the last four hours may be waived if the pilot reaches proficiency with the FMS and Pro Line 21 System.

Second, the Board recommended that the differences level for crewmember currency in the LR-60XR be Level C. However, it may be adjusted to Level A depending on crewmembers currency with the FMS and Pro Line 21 Systems.

In late 2009, a LR-60XR 14 CFR Part 135 operator requested an FSB concerning the IFIS-5000 and the possibility of utilizing the paperless concept in air carrier operations. The board consisted of the FSB chairman evaluating the system and reviewing all certification documents. An electrical load analysis was requested but never produced. Revision 1 to this FSB Report was initiated and published.

In late 2010, Bombardier Learjet requested an update to the FSB report and provided an electrical load analysis package. The Bombardier Training Center also requested an update to the FSB generated from customer / industry feedback requesting additional simulator system integration experience and less classroom ground training .The Training Center also requested a Line Operational Evaluation to critique and evaluate each student's level of knowledge and proficiency. The electrical load analysis and LR-60 and LR60XR Differences Curriculum provided by the Bombardier Training Center was reviewed and evaluated. Revision 2 to this FSB Report was initiated and published.

APPENDIX D

ROCKWELL COLLINS PROLINE 21

INTEGRATED FLIGHT INFORMATION SYSTEM - 5000

CLASS 3 ELECTRONIC FLIGHT BAG OPERATIONAL EVALUATION

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1. PURPOSE AND APPLICABILITY

The following is provided for the benefit of FAA Principal Inspectors and aircraft operators for their use in determining the acceptance of EFB applications. As described in AC 120-76A, Guidelines for the Certification, Airworthiness, and Operational Approval of Electronic Flight Bags Computing Devices, the Collins IFIS-5000 is certified Class 3 EFB Hardware and Type C applications. Class 3 EFB hardware is installed equipment and requires AIR, AEG and POI involvement. The applications are classified as Type C due to the functionality and interaction of the Electronic Charts. The charts can be manipulated (i.e. zoomed, scrolled, etc.) as Type B, but are classified Type C because aircraft "own ship position" is provided on the installed display on the airport depictions and charts. Referencing the Electronic Charts section, this function has been certified as a situational awareness tool and is not intended to alleviate the crewmember from carrying primary navigational reference materials, i.e. paper charts.

Per AC 120-53A, the EFB functions are classified as Training Level C, Checking Level C, and Currency Level C.

This Appendix is applicable for operational approval of the IFIS-5000 system as an Electronic Flight Bag in the following aircraft:

- Bombardier Learjet Inc. Model LR-60XR

As previously noted, the Electronic Charts section has been certified as a situational awareness tool and is not intended to alleviate the crewmember from carrying primary navigational reference materials. The IFIS-5000 integration is approved “paperless” for a time limit of 0.5 hours (30 minutes) due to the main battery emergency capacity and no electronic chart backup. The aircraft must be able to descend and land at a suitable airport within this time period. The paperless time limit may be increased based on the individual aircraft’s approved electrical load analysis referencing Main Battery Capacity Analysis (Table 15 – Total Time Available in Hours). The FSB recommendation for unlimited (no time limit) paperless approval would require implementing at least one (1) of the following contingency recommendations:

- a) Redundant EFB application hosted on different / secondary EFB platform
- b) Primary paper products carried by selected crewmember, (i.e. Trip Kit)
- c) Complete set of sealed paper backups in the aircraft accessible to flight crew
- d) Procedural means to allow flight crew access to charts in event of dual generator failure.

2. EFB DESCRIPTION

IFIS-5000 System

The Integrated Flight Information System (IFIS) provides supplemental information, such as weather and electronic charts, in the cockpit via Adaptive Flight Displays (AFD). The IFIS functions are intended to provide situational awareness only and do not provide alerts or warnings. The three major functions provided by the IFIS-5000 are; support for navigational charts, enhanced map overlays, and graphical weather images. The charts function allows the viewing of selected Jeppesen aeronautical charts. The Enhanced Maps function is split into an application and a server that together provide map overlays of geopolitical, airspace, airway data and visual navigation information. The Graphical Weather function option provides various weather images. The Graphical Weather System is operator selected as either XM or Universal however, only a single graphical weather system is approved for installation at a time.

The following Rockwell Collins Pro Line 21 IFIS-5000 components are required as a minimum for “paperless” operational approval.

Quantity	Description	Hardware / Software	Part Number
2	FSU-5010	Hardware	822-1543-XXX
2	ECU-3000	Hardware	822-1200-XXX
2	AFD-3010E	Hardware	822-1753-XXX
2	CCP-3000	Hardware	822-1746-XXX
2	MMT-5000	Hardware	822-1811-XXX
2	FSA-5000	Software	822-0001-XXX

2	ECH-5000	Software	810-0002-XXX
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FSU-5010

The File Server Unit (FSU-5010) is a dedicated LRU with three major functions that provide the processing platform for the IFIS: Solid-state memory; a processor capable of running one or more applications, and high-speed ethernet communications with other avionics. The FSU provides the mass data storage within its mass storage hardware, necessary for up-linked graphical weather, enhanced map overlays and electronic charts displayed on the MFD. Ethernet bussing provides the high-speed connection to the MFD. The high speed ethernet connection minimizes the time taken to respond to a display request from the pilot, while providing a level of integrity to the data being transmitted.

CCP-3000

The Cursor Control Panel (CCP-3000) is mounted in the flight deck to provide additional pilot controls necessary for the chart function. These functions include:

- Selection and de-selection of the chart display on the MFD
- Zooming a specific area of a chart to provide better readability
- Panning a chart to view different areas of the chart while zoomed
- Rotation of charts between landscape and portrait orientation
- Selection of a specific chart from the thousands contained in the database

IFIS-5000 Functions

Electronic Charts, Graphical Weather and Enhanced Map Overlays functions each require an active subscription. Rockwell Collins Integrated Flight Information System IFIS-5000 Operator's Guide must be immediately available to the flight crew.

Electronic Charts

The Electronic Aeronautical Charts and Approach Plates are intended to provide ease of chart access and improved situational awareness by allowing the display of aircraft present position on Geo-referenced charts. The Electronic Charts function is NOT intended to alleviate the crew from carrying primary material in the form of paper charts. Operational Approval for EFBs is required to substitute Electronic Charts for Paper Charts.

The Electronic Charts feature will typically provide information to include (but is not necessary restricted to): the display of charts for arrival, approach, departure, airport and NOTAMS. Access to the Electronic Charts format is via a CCP chart button. Integration with the Rockwell Collins FMS flight plan data provides easy access to all charts pertinent to the flight plan. Pilot entered station IDs are allowed. The Electronic Chart function provides aircraft position on all geo-referenced charts. The FMS transmits flight plan information (origin airport, destination airport, destination arrival, destination approach, and alternate airport) used by the electronic chart function. Charts associated with each flight plan element are listed on the MFD chart selection menu. A single action selects any of these charts for immediate display.

IFIS-5000 electronic chart feature includes:

- Approach Charts and Airport Diagrams
- Terminal Area Arrival / Departure Charts
- Chart Notices to Airmen (NOTAMs)

If airport diagrams are referenced to geographical coordinates, an aircraft symbol is superimposed on the airport diagram to enhance position awareness. Approach charts referenced to geographical coordinates also have an aircraft symbol superimposed on the chart to enhance situational awareness.

Enhanced Map Overlays

The File Server Unit (FSU) provides several map databases that contain additional data that can be overlaid on the MFD PPOS & Plan Maps. The additional map databases include:

- Geographic Data (lakes, rivers, and political boundaries)
- Airways (“Victor” airways and “jet” routes)
- Airspace depictions

The Enhanced Map application does NOT serve as the primary means for positional information in the cockpit. The features provided by the Enhanced Map application are only considered to provide Minor Hazards in cruise. Enhanced Map overlays are advisory and not to be used for navigation. Navigation data related to approach is provided by the charts application.

Graphical Weather Function

The IFIS-5000 system will support several graphical weather functions. The weather radar is the primary means for aiding “tactical” short-range navigation decisions, while the strategic planning can be performed using the longer-range graphical weather data. Graphical Weather may NOT be substituted for weather radar. Weather Radar provides thunderstorm detection and avoidance information in compliance with 14 CFR requirements.

The Graphical Weather function provides weather information to pilots to enhance awareness of the flight situation by providing a strategic meteorological overview. The intention is to improve operational safety and efficiency. The graphical weather feature provides the display of stored graphical weather images. A menu allows the pilot to select available graphical weather images that are stored in the FSU. Stored images are down linked through the XM or Universal CMU receiver to the FSU. The data received is broadcast from a ground weather service provider. The graphical information can be panned and zoomed using the Cursor Control Panel Joystick and Zoom buttons. The information provided is:

- NEXRAD Radar images
- Echo Tops (Altitude, speed and direction of the tops of major storm cells)
- Graphical and textual METAR
- Graphical and textual Significant Meteorological advisory (SIGMET)
- Textual Airman’s Meteorological advisory (AIRMET)
- Textual Terminal Aerodrome Forecast (TAF)

3. EFB MOUNTING

EFB applications can be displayed on either pilot or copilot MFD and have been certified as part of the type design.

4. EFB DISPLAY AND REFLECTIVITY

The EFB has been evaluated in both low light and full sunlight. The display is readable under the full range of lighting without distraction.

5. EFB PROCEDURES AND DATABASE REVISIONS

The database effectivity format that is displayed on the MFD is designed to allow the flight crew (or maintenance personnel) to ascertain the currency of the installed databases. The databases listed on this page include:

- FMS Database (28 day update cycle)
- Charts (14 day update cycle)
- Airspace (28 day update cycle)
- Geographic (update on user demand)
- Political (update on user demand)
- Graphical Weather (update on user demand)

The database effectivity format provides information regarding the begin date, end date, and currency status of each of the installed databases. When databases are selected on the page, the format also provides detailed information regarding the database regions of coverage. When an installed database is out of date, the flight crew is provided a “CHECK DATABASE STATUS” annunciation (only when on the ground) in the Lower Format Window. When this annunciation is displayed, the operator can select the Database Effectivity page and a “NOT CURRENT” annunciation (in yellow) is displayed in the status column.

6. FSB SPECIFICATIONS FOR TRAINING

Training level is set at Level C. Level C training requires mastering the FMS and EFB functions. As a minimum, the crew should use the FMS to flight plan and the EFB electronic chart functions to pull up the airport depiction charts, SIDs, Arrival Procedures, and approach charts. Pilots should master the graphic weather depiction functions to obtain METARS and TAFs for origin, destination, and alternate airports.

7. FSB SPECIFICATIONS FOR CHECKING

Checking level is set at Level C. Level C checking requires a demonstration of proficiency in a task or system. A check is required for Initial, Transition or Initial Differences training. The check may be administered by a company chief pilot, company check airman, company instructor, a Designated Pilot Examiner, Training Center Evaluator, or other FAA representative. Recommended tasks include demonstrating competency in using the FMS to integrate use of the electronic chart functions to display departures, arrivals, approaches, and utilization of the graphical weather text functions.

8. FSB SPECIFICATIONS FOR CURRENCY

Currency level is set at Level C. Currency is required in using the FMS and EFB electronic charts and weather depictions. The crewmember must utilize the IFIS 5000 in flight or an approved simulator within 3 calendar months or reestablish currency in the system by re-accomplishing the Level B Checking requirements specified by this report. For Part 91 operations only, the Level B Checking requirements of this report may be accomplished under the supervision of an appropriately current and qualified Pilot-in-Command for the purpose of reestablishing IFIS-5000 System currency.

9. FSB SPECIFICATIONS FOR DEVICES OR SIMULATORS

The Level C training specified above may be conducted in a LR-60XR simulator or aircraft that is equipped with the IFIS-5000 system. The Level C checking specified above (i.e. FMS, EFB) may be conducted in a simulator or aircraft that is equipped with the IFIS-5000 system. There have been no stand alone FMS/IFIS trainers evaluated.

10. ENVIRONMENTAL TESTING (HIRF, EMI, Decompression)

High Intensity Radiated Fields (HIRF) and Indirect Effects of Lightning (IEL) for the IFIS-5000 system were tested per High Intensity Radiated Fields (HIRF) And Lightning Indirect Effects Test Procedure. The system meets Certification Basis requirements and special conditions for High Intensity Radiated Fields and Indirect Effects of Lightning Compliance Reports 60D1927 and 60D1928.

11. INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

Instructions for Continued Airworthiness (ICA) for the IFIS-5000 system are addressed in accordance with aircraft certification requirements and available through normal ICA distribution processes.

12. COMPLIANCE CHECKLIST

Compliance checklists are provided as an aid to identify those specific rules or policies for which compliance has been demonstrated to the FAA regarding the IFIS-5000. The checklist includes rules or policies for which compliance must be demonstrated by individual operators. Not all rules, policies or variants are necessarily listed or addressed.

The provisions of this report have shown compliance with the following regulations:

- (1) Title 14 CFR §§ 91.9, 91.21, 91.103, 91.167, 91.169, 91.503, 91.605, 91.1023, 91.1025, 91.1063, 91.1065, 91.1067, 91.1069, 91.1073, 91.1075, 91.1077, 91.1079, 91.1081
(2) Title 14 CFR §§ 135.21, 135.23, 135.63, 135.81, 135.83, 135.144, 135.179, 135.213, 135.293, 135.297, 135.299, 135.323, 135.325, 135.327, 135.329.

13. LIST OF EFB AFFECTED DOCUMENTS

The following is a list of Procedures, Documents and Affected Manuals concerning Operational Approval of the IFIS -5000 for use as an Electronic Flight Bag:

- Rockwell Collins Integrated Flight Information System IFIS-5000 Operator's Guide
- Flight Crew Operations Manual
- Flight Crew Training Program
- Training Courseware (Flight Crew, Maintenance Personnel, Operations Personnel)
- Company Maintenance Procedures
- Component Maintenance Manuals
- Minimum Equipment List
- Data Delivery and Management Procedures
- EFB Configuration Control Procedures

14. ALTERNATE MEANS OF COMPLIANCE

Approval Level and Approval Criteria

Alternate means of compliance to the provisions of this report, must be approved by MKC-AEG. If alternate compliance is sought, operators will be required to establish that any proposed alternate means provides an equivalent level of safety to the provisions of AC 120-76A and this FSB report. Analysis, demonstrations, proof of concept testing, differences documentation, or other evidence may be required.

Requires Equivalent Safety

In the event alternate compliance is sought, training program hour reductions, simulator approvals, and device approvals, may be significantly limited and reporting requirements may be increased to assure equivalent safety. The 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.

Unforeseen Circumstances

In the event of clearly unforeseen circumstances in which it is not possible for an operator to comply with the report provisions, the operators may seek an interim equivalent program rather than a permanent alternate compliance method. Financial arrangements, schedule adjustments, and any other unjustifiable reasons are not considered "unforeseen circumstances" for the purposes of this provision.